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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

HONORABLE MENTION.

THE NAVY AND COAST DEFENCE.

By COMMODORE W. H. BEEHLER, U. S. Navy.

Motto: *"When a strong man armed keepeth his palace, his goods are in peace."*—St. Luke, xi: 21.

The President, our commander-in-chief, in a recent address at the Naval War College, clearly refuted the idea of having a navy merely for coast defence. Nothing could have been more opportune than the definite statement of the real relationship of the navy to the coast defence. He said: "For the protection of our coasts we need fortifications. We need to have these fortifications, not merely to protect the salient points of our possessions, but we need them so that our navy can be foot-loose."

The navy consists of fleets of battleships, cruisers and destroyers, with auxiliaries and naval bases. The object of the navy is to protect our country, necessarily including our country's honor, from all foreign enemies by aggressive defensive operations. It is not adapted for service against domestic foes, and when the navy is called upon in emergency to act against domestic foes, it only co-operates with the army, and this is especially true in regard to the navy's coadjuting corps of marines. Foreign

enemies are, therefore, to be engaged by the navy, and the controlling principle governing the efficiency of the navy must be its adequacy to attack and defeat any foreign foe.

If our navy is adequate for this purpose, the fact must be established and known, so that no one will dare to dispute it, unless, blinded by hate or prejudice, he should ignore or doubt this preparedness.

Mere possession of fleets of battleships, cruisers and destroyers, with auxiliaries and naval bases, is, however, not sufficient to deter an aggressive enemy. It is much more vitally important to know how to use these components of the navy. They must be handled efficiently, and foreigners, who might become possible enemies, must be convinced that our navy is handled efficiently. The cruise of the Atlantic battle fleet around the world is a demonstration of our efficiency in regard to this fleet. Our superiority in target practice is well established, but much still remains to be done, not only to keep up to the high standard of efficiency already attained, but to enlarge our potentialities and develop the other components of the navy.

The cruisers are efficient in themselves, but the development of their efficiency to the present standard is only a step beyond that which our cruisers have attained since the Civil War. For the greater part of this period we had nothing but cruisers, and we need not feel ashamed of them. The navy did well with the cruisers, and their efficiency for searching the seas is recognized. But definite plans must be formulated and studied to arrive at the proper organization of cruisers with a fleet, or in scouting squadrons, for the great object of deterring foreign nations from going to war with us, by the conviction that we can command the seas efficiently, and no foe could elude the efficient scouting cruisers that would bring a formidable battle fleet to crush him at the very outbreak of war.

The torpedo craft form a weak spot in our service, and though our destroyers made the cruise to the Pacific coast, it is evident that their operations are limited to within range of reliable wireless communication with the fleet and naval base, or the naval coast patrol. A new and larger type of destroyers is now being built, and this larger type will constitute the destroyer force of each battle fleet. Our present destroyers will be replaced by these new and more efficient vessels, and the old destroyers will

be classed with the torpedo boats and not be assigned as a part of the battle fleet.

The auxiliaries form an important part of the battle fleet. These cruising auxiliaries include the colliers, supply ships, repair ships, transports and hospital ships, which are necessary parts of a well organized battle fleet. The efficiency of these auxiliaries is being developed to the highest standard by actual experience with the fleets.

There are other necessary naval auxiliaries besides those which accompany the battle fleet; these are Navy-Coast-Defenders, including torpedo boats, submarines, mine-laying vessels, tugs, monitors, and old and obsolete battleships and cruisers that may be still serviceable for the protection of the naval bases or important strategic channels, such as the Straits of Florida, the Panama canal, Puget Sound, and the Philippine waters.

The naval bases are the navy yards and naval stations, both at home and in our possessions. At these points the Navy-Coast-Defenders must co-operate with the army coast defence, in order that the fighting fleets of battleships, cruisers and destroyers can be "foot-loose" and obtain supplies, coal, repairs, etc. These bases must be protected, and, necessarily, the Navy-Coast-Defenders will co-operate with the army. The fighting fleet has no part in coast defence; it operates against the enemy's fleet. The fleet must command the sea, and if it is efficient our coast will not be attacked. In the Russo-Japanese War the coast of Japan needed no protection against the formidable Russian fleet, because the Japanese first sought complete command of the sea. They kept their superiority over the poorly trained, inexperienced Russians, who had never left the Baltic before the war. The destruction of the Russian fleet rendered Japanese coast defences unnecessary.

In the war with Spain the United States' coasts were not attacked, because Sampson cruised on Key West's strategic line of force to Porto Rico and commanded the approaches to our coasts. In both of these most recent wars the naval victories alone compelled peace.

Our main reliance for coast defence consists of the battle fleets in position, either off the enemy's ports, or disposed to intercept and attack the enemy's fleet on any possible route of approach. In these days of submarine cables and wireless telegraphy there

is no place in any sea where any considerable force could play a game of hide-and-seek. Nelson's search for the French fleet from Europe to the West Indies and back could not be repeated in the face of our present facilities for obtaining information.

To protect the country our navy must command four different spheres: the Atlantic, Pacific, West Indies and Philippines. Command of the sea in these four spheres is essential, and it can only be attained by an adequate naval force.

The Atlantic and West Indies may be grouped, but a battle fleet is necessary for each, because one of these two fleets may be required to reinforce the Pacific fleet, via the Panama canal, and the Atlantic could not long be safely left without any battle fleet. Similarly, the Pacific and Philippine fleets could be grouped, but two fleets are required in case one of them should be needed elsewhere. For the sake of economy, it may be urged that it would be safe to have but three fleets, one for the Atlantic and the West Indies, and the other two for the Pacific and the Philippines, with a fourth fleet in reserve at the Atlantic naval base. A fleet in reserve sounds well from an economical point of view, but it is an element of weakness rather than of additional strength. Vessels in reserve are practically useless for the fighting fleet, as they can not be kept in the most efficient condition while in reserve at a navy yard, with reduced crews. These crews simply take care of the ship. They are not keyed up by constant training and drill, which is only possible when cruising, and should such vessels be suddenly called on to go into action, manifestly a high degree of efficiency could not be expected of them. When a reserve ship is assigned to a fleet it reduces the average fighting efficiency of the fleet by that of the reserve ship, to some extent in the same manner that the speed of a fleet is only that of the slowest ship in the fleet. A reserve ship must, necessarily, be slower, be less efficiently handled by inexperienced officers and men, and less accurate in hitting hard than the trained ships of the fleet. *"Better not hit at all if you cannot hit hard."*—President Roosevelt.

The Austrian navy has developed the principle of a reserve navy far beyond that which would be possible with us. For urgent financial reasons the Austrian naval budget is limited, and the cruises of the fighting ships are restricted to brief periods in the Adriatic. At Pola, the entire navy is kept moored in various categories of reserve. Strenuous work is required of officers and

men when the reserves are frequently sent out, but with all it is impossible to attain the highest degree of efficiency without constant practice at sea. New developments are constantly arising, and that which was thought good yesterday is to-day displaced by a better method evolved in the actual school of experience. Naval proficiency cannot be attained from printed volumes; actual experience only can develop the highest efficiency.

The situation must be met squarely, and a reserve fleet must be considered as the device of an enemy. To be thoroughly prepared for war, we should avoid having fighting battleships in reserve at navy yards as we would avoid a contagious disease.

Some years ago the writer was enthusiastic in his praise of the efficiency of the reserve of the German navy. Each ship of the German navy has its own station, its own storehouse, and all the stores of that particular ship, whether of the first, second or third category of reserve, are kept ready for emergency. Non-perishable stores, including coal and oil fuel, are kept on board. Everything is kept in readiness for immediate departure of the first category of reserve for mobilization and activity with the fleet. All of the officers and men of these ships in reserve are always available, though but a small percentage are kept on board. The officers and men go to their homes and are called out by telegraph, when each and every one immediately goes back to the identical position he had when the ship was placed in reserve. Surely such vessels kept in such a condition of reserve may render good service, but, manifestly, not as good as one that is and has been constantly cruising and drilling with the fleet.

The compulsory military and naval service in Germany makes this scheme of reserve much more practicable than would be possible with us. We could not put a battleship in reserve and have 80 per cent of her officers and men at home pursuing other vocations, ready to muster on board by telegraph. The expense of maintaining a battleship in reserve under such conditions would be but little less than that if in commission, except the expense of steaming, which is more than repaid by the experience attained, and by the better efficiency of the machinery by being in use.

The voyage of the Atlantic fleet to the Pacific demonstrated that, upon the arrival of the fleet at San Francisco, all the vessels were in much more efficient condition than when they had left.

When German naval officers were praised for the efficiency of

the German naval reserve, it was observed that they laid no stress upon this as especially noteworthy. The reserve ships are all right to comply with the letter of the law of compulsory military service, but the best ships are never put in reserve; they are kept in full commission. It is only when undergoing extensive repairs that a modern, up-to-date German battleship is placed in reserve. They cannot afford to lose any opportunity for training and drill with any one of their battleships, nor can we.

The real fighting force of battleship fleets must be kept up to the highest state of efficiency. Individual ships must each be the best of their type, and any deficiency in any one will to that extent weaken the force. Obsolete battleships must not be grouped with the most efficient.

Rapid changes in design and construction must, necessarily, make it impossible to have four fleets composed of only the most modern types. With 16 battleships in a fleet, it is doubtful if we could hope to have more than one fleet of 16 battleships all about four years old. It is good work to get a first-class battleship in commission, with a trained personnel, within four years from the date of her authorization, or even after her keel shall have been laid. Compromise is necessary, but the ideal standard must always be kept in mind. The age limit is the best guide, and the rule to regard 15 years as the limit of age in fighting efficiency of a battleship is the only logical conclusion. Battleships of 15 years of age must not be put in the fleet with new ships. Each fleet should be composed of one or two squadrons of two divisions each, and each division should consist of four homogeneous ships of the same age. Our four fleets should thus each have divisions of approximately homogeneous units. The divisions in each fleet may be unequal, but the fleet should have no ship over 15 years old. Battleships over 15 years old should be assigned as Navy-Coast-Defenders, where they will still be serviceable at least 10 years longer.

DISPOSITION OF THE FLEET.

The Atlantic fleet must have command of the north Atlantic ocean, and it must be ready to attack an enemy in any part of that ocean. This fleet should generally cruise on a strategic line of force extending from beyond Nantucket Light Ship towards Hatteras. On this line the fleet will be sufficiently near its bases

(Norfolk, Philadelphia and New York, including Newport and Boston) to be fully prepared to proceed to attack an enemy in the Atlantic. Scouts and cruisers of the Atlantic fleet should be spread out fan-wise to cover, by wireless, the entire sphere, especially west of the fiftieth meridian and beyond to the eastward in advance of the fleet when crossing the Atlantic.

The object of war is to destroy the enemy's fleet, and in time of peace every effort should be made that when the time comes the fleet shall be able to proceed with its maximum strength to overcome the enemy's fleet, by attacking him with a relatively superior force.

The Atlantic fleet should not be allowed to stay in port at the bases, but should be kept cruising in formation and maneuvering for the best possible results. Long drill periods along the strategic lines of force cannot be *constantly* maintained, as vessels of the fleet must frequently return to the bases, and occasional week-end visits will be desirable. The fleet would then assemble and maneuver from Tuesdays until Fridays on the strategic lines of force during periods of such occasional week-end visits.

The West Indian fleet is the reserve of the Atlantic fleet, and, *vice versa,* the Atlantic fleet, under some conditions, especially after the completion of the Panama canal, will be the reserve of the West Indian fleet. No other reserves can be provided for the fighting fleets. Each fleet will have a reserve by uniting with the fleet in its adjacent sphere. The West Indian fleet when cruising on the Key West-Porto Rico strategic line of force should, at the very outbreak of war, follow up the Atlantic fleet enroute across the Atlantic, to reinforce the Atlantic fleet and unite in crushing the enemy's fleet with an overwhelming relative superiority.

A thoroughly well organized and highly trained efficient fighting fleet should be capable of crossing the Atlantic from its strategic line of force to meet the enemy's fleet with such relative superiority that he must sue for peace.

Before the recent cruise of the Atlantic fleet to the Pacific and Australia, an attack on the enemy's fleet on the other side of the Atlantic would have been regarded as rather venturesome, but this cruise demonstrates its feasibility. If we can not go with a foot-loose fleet to attack the enemy's fleet, the enemy will come and attack us, and with relative superiority, at such point of attack as he may choose.

With a foot-loose Atlantic fleet, that has been kept constantly cruising and drilling on the Atlantic strategic lines of force, much better results will be attained by attacking the enemy than by waiting for the enemy to attack us. In proceeding to the attack we prove that we have command of the sea, and the thorough preparation necessary to start will be one-half of the victory, and the chances are that the enemy will hasten to make peace before the enemy's fleet is met.

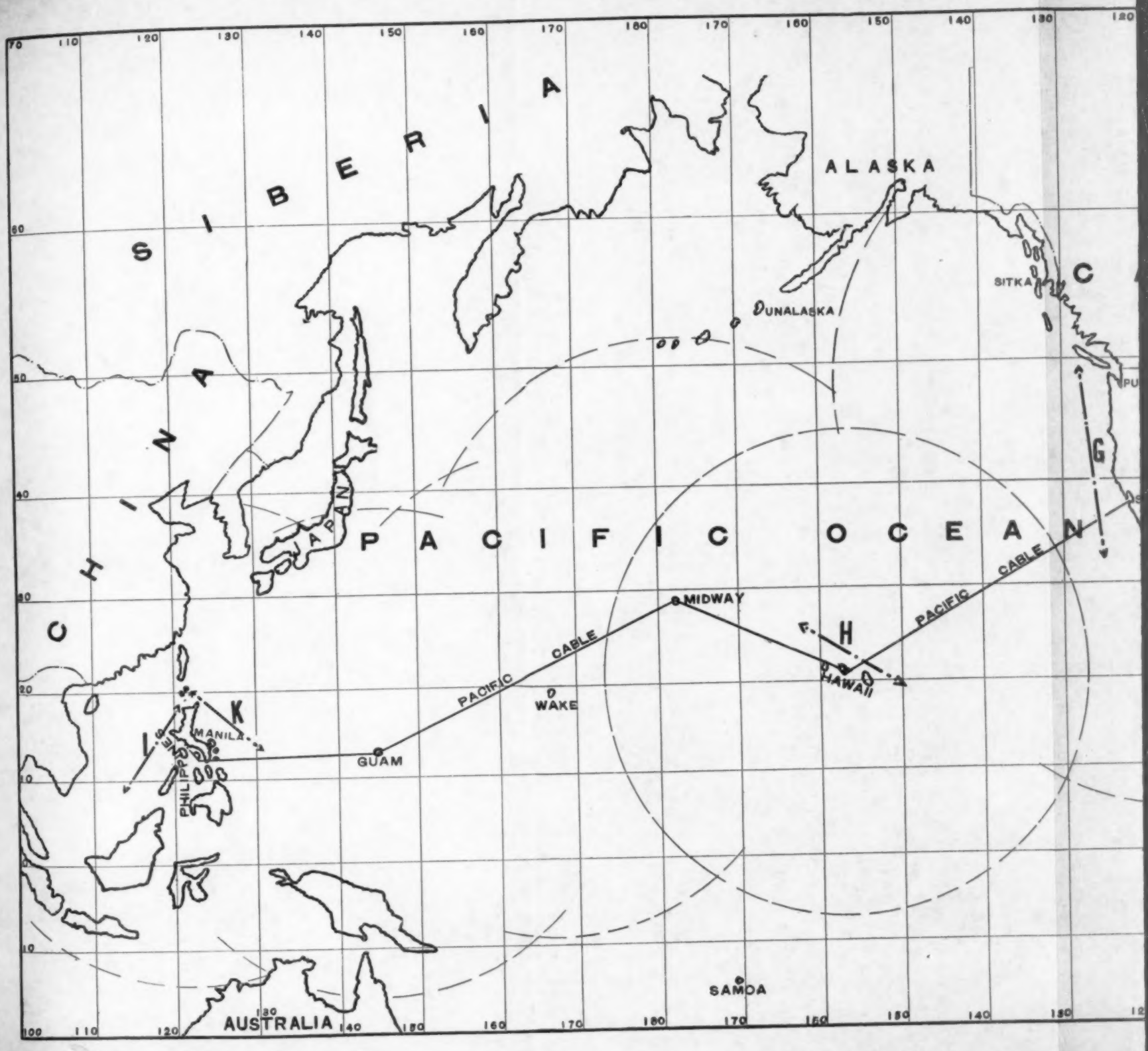
THE STRATEGIC LINES OF FORCE.

To provide for command of the sea in our four spheres of naval operations the fleets in each sphere must have some definite position of departure, and not at any one base, but at sea on a strategic line of force; that is, at a convenient rendezvous from one or more naval bases, and from which the battle fleet can best command approaches and proceed to attack the enemy in the shortest time.

The line extending from beyond Nantucket to Hatteras is well adapted for the Atlantic fleet, with many advantages for starting across the Atlantic with favorable winds and currents. It is also in position to readily take up the Key West-Porto Rico strategic line of force and command the Gulf, Caribbean and approaches to the Panama canal, should the canal be threatened.

The West Indian fleet would have the Key West-Porto Rico strategic line for cruising, alternating with the direct line from Guantanamo to Colon until after the Panama canal shall have been completed when the West Indian fleet should also cruise on a strategic line in the Pacific, a line extending from latitude 2° north, longitude 81° west, to latitude 10° north, longitude 90° west; that is, a line parallel with the Central American coast, blocking approaches to Panama. From this Panama strategic line of force, the West Indian fleet is in position to go and reinforce the Pacific fleet, if the theatre of war is confined to the Pacific. Or, the Pacific fleet may relieve the West Indian fleet on its Panama or Key West strategic line of force while the West Indian fleet goes to reinforce the Atlantic fleet, if the theatre of war is confined to the Atlantic.

The Pacific fleet should have a strategic line of force off the northern Pacific coast and parallel therewith, extending between the two routes Honolulu to San Francisco and Honolulu to Puget Sound. In this position the Pacific fleet will be convenient to its


SIBERIA
ALASKA
CHINA
JAPAN
PACIFIC OCEAN
UNALASKA
SITKA
MIDWAY
HAWAII
WAKE
GUAM
MANILA
PHILIPPINES
SAMOA
AUSTRALIA
PACIFIC CABLE
PACIFIC CABLE
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120
110
100
90
80
CANADA
PUGET SOUND
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UNITED STATES
BOSTON
NEW YORK
PHILADELPHIA
WASHINGTON
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NORFOLK
SAN FRANCISCO
N
SAN DIEGO
MEXICO
KEY WEST
C
B
E
D
CHIRIQUI LAGOON
BOLON
F
ANAMA
SC

STRATEGIC LINES OF FORCE FOR FLEETS
TO COMMAND THE SEA IN FOUR SPHERES.
A ATLANTIC
B KEY WEST, PORTO RICO
C KEY WEST, YUCATAN
D COLON, GUANTANAMO
E COLON, YUCATAN
F PANAMA
G PACIFIC
H HAWAIIAN
I PHILIPPINE, WEST
K PHILIPPINE, EAST
ARCS OF CIRCLES (BROKEN LINES)
SHOW RANGE OF RELIABLE WIRELESS
BOSTON
NEW YORK
A
A T L A N T I C
BERMUDA
O C E A N
B
PORTO RICO
D
AFRICA
SOUTH AMERICA
80
70
60
50
40
30
20
10
0
40
30
20
10
0
10

bases and in the best position to proceed west, north or south, as may be required.

The Hawaiian strategic line of force would be on a line either parallel with the Hawaiian Islands, about 200 miles from Honolulu, or on a line running north and south.

The Philippine strategic line of force would be in the China sea off the coast of Luzon, with various positions for the best command against any enemy that may appear in this sphere.

SCOUTING.

The fleets in our four spheres being established on their respective strategic lines of force, the command of the sea will be exerted through the scouts in each sphere. These scouts should be spread out fan-wise, as mentioned for the Atlantic fleet. Until the completion of the Panama canal the scouts for the West Indian fleet will serve for both the Atlantic and the West Indian fleets; but after the completion of the canal, with the occupation of the Panama strategic line of force, the West Indian scouting force must extend over the central Pacific ocean. The scouts should cover the approaches to Panama from the southern Pacific, and keep in wireless communication with Samoa, Honolulu and San Diego, as well as in touch with the scouts of the Pacific fleet and on the Pacific lines of force. The scouts of the Pacific fleet will have an immense area to cover, even by assigning a large portion to the West Indian fleet.

The Pacific fleet must evidently have a much larger force of scouts than the other fleets, and, in addition to this largely increased force of scouts, there should also be a fleet of armored cruisers, which may be designated as the Hawaiian flying fleet. This fleet should cruise over the Pacific and develop a perfect system of scouting, to give absolute command of the entire Pacific ocean; it should be in touch with the Pacific fleet on one side and the Philippine fleet on the other. This powerful fleet of first-class armored cruisers, with divisions of homogeneous units, will insure the command of the Pacific, and it will be relatively stronger than an enemy's fleet that may not be composed of such homogeneous units.

The Philippine scouts will cover the western part of the Pacific, around the Philippine Islands to Guam, and keep in touch with the fleet on its strategic line of force, and also with the wireless

stations in the Pacific at Guam, Midway and Wake Island, to be established, or cable communication wherever possible.

With this explanation of what is required for us to command in our four spheres, it is necessary to determine what must be the strength of each fleet in order to be adequate for us to have a relatively stronger force than that of any enemy in that sphere.

The United States navy is proud of its achievements in the past, and our naval victories justify our claim to superiority, but in every case victory has only been obtained by a relatively superior force. We have won victories over superior forces, but we were superior at the point of contact; relatively superior over a part of the enemy, and, therefore, we defeated him. Lessons from history—the battle of the Nile, Trafalgar, etc.—show that Nelson was relatively superior at the point of contact, and to be victorious we must plan to give our fleets relative superiority in each sphere. (See "War on the Sea," by Capt. Gabriel Darrieus, translated by Prof. P. R. Alger, in PROCEEDINGS OF THE U. S. NAVAL INSTITUTE.)

From *Brassey's Naval Annual*, 1908, the following tables show the naval strength of the principal powers; and there is no guesswork about this list, no secrecy whatever in regard to the actual fighting strength of all the navies of the world. This certain knowledge of the available naval forces possessed by each nation is one of the most potent factors in the preservation of peace.

But, as previously stated, the fact that this available naval force possessed by each nation can be handled effectively must also be thoroughly established and well known to insure peace. It takes from two to four years to build a battleship, and at least one year more before the personnel of that ship can be trained to handle such an instrument of precision effectively. Demonstrations of efficiency are also necessary to convince the world that the naval strength is all that is claimed for it.

The policy of making long cruises not only develops the effectiveness of the naval force, but gives the strongest argument for not going to war against a well prepared navy.

Therefore, studying the fleets of the world as we find them to-day, our naval forces should be so organized in fleets and squadrons that we may soon command the seas in each and all of our four spheres.

BATTLESHIPS.

GREAT BRITAIN.

Launched.	Name.	Displacement. Tons.
	Collinwood	19,250
	St. Vincent	
	Vanguard	
1907	Bellerophon	18,600
1907	Temeraire	
1907	Superb	
1906	Dreadnought	17,900
1906	Lord Nelson	16,500
1906	Agamemnon	
1903	Edward VII	16,350
1903	Commonwealth	
1903	Dominion	
1903	Hindustan	
1904	New Zealand	
1905	Africa	
1904	Britannia	
1905	Hibernia	
1903	Swiftsure	11,800
1903	Triumph	
1902	Queen	15,000
1902	Prince of Wales	
1901	Albemarle	14,000
1901	Cornwallis	
1901	Duncan	
1901	Exmouth	
1901	Russell	
1898	Formidable	15,000
1898	Irresistible	
1899	Implacable	
1899	London	
1899	Venerable	
1899	Bulwark	
1897	Canopus	12,950
1899	Glory	
1898	Albion	
1898	Goliath	
1898	Ocean	
1899	Vengeance	
1894	Magnificent	14,900
1895	Majestic	
1895	Prince George	
1895	Victorious	
1896	Caesar	
1896	Hannibal	14,900
1896	Illustrious	
1895	Jupiter	
1896	Mars	
	47 Ships *	720,650

* One projected.

FRANCE.

Launched.	Name.	Displacement. Tons.
	Danton	17,710
	Condorcet	
	Diderot	
	Mirabeau	
	Vergniaud	
	Voltaire	
1903	Patrie	14,635
1902	République	
1905	Liberté	
1904	Justice	
1907	Vérité	
1904	Démocratie	
1899	Suffren	12,527
1896	Bouvet	12,007
1895	Massena	11,735
	15 Ships	230,389

JAPAN.

Launched.	Name.	Displacement. Tons.
	A	§20,800
	B	
1907	Aki	19,800
1906	Satsuma	19,350
1905	Kashima	16,400
1905	Katori	15,950
1902	Iwami	13,516
1900	Hizen	12,700
1899	Asahi	15,200
1900	Mikasa	15,200
1898	Shikishima	14,850
1898	Sagami	12,674
1900	Suo	
1896	Fuji	12,320
	14 Ships	222,134

§ Doubtful.

BATTLESHIPS—*Continued.*

UNITED STATES.

Launched.	Name.	Displacement. Tons.
	Delaware	20,000
	North Dakota	
	Michigan	16,000
	South Carolina	
1905	Idaho	13,000
1905	Mississippi	
1904	Connecticut	16,000
1905	Kansas	
1904	Louisiana	
1906	Minnesota	
1906	New Hampshire	
1905	Vermont	
1904	Georgia	14,948
1904	Nebraska	
1904	New Jersey	
1904	Rhode Island	
1904	Virginia	
1901	Ohio	12,440
1901	Maine	12,300
1901	Missouri	
1898	Wisconsin	11,653
1898	Alabama	11,565
1898	Illinois	
1898	Kearsarge	11,540
1898	Kentucky	
	25 Ships †	363,643

† Two projected.

RUSSIA.

Launched.	Name.	Displacement. Tons.
1907	Imperator Pavel I.	17,200
1906	Andrei Pervozvannyi	
1906	Ioann Zlatoust	12,733
	Evstafi	
1903	Slava	13,516
1901	Cesarevitch	12,912
1900	Panteleimon	12,480
	7 Ships	97,634

GERMANY.

Launched.	Name.	Displacement. Tons.
	Ersatz Baden	18,307
	Ersatz Württemburg	
1908	Nassau	17,679
	Ersatz Sachsen	
1904	Deutschland	13,200
1905	Hanover	
1905	Pommern	
1906	Schlesien	
1906	Schleswig-Holstein	
1902	Braunschweig	12,997
1903	Elsass	
1903	Hessen	
1903	Preussen	
1904	Lothingen	
1900	Wittelsbach	11,643
1901	Wettin	
1901	Zahringen	
1901	Mecklenburg	
1901	Schwaben	
1896	Kaiser Friedrich III	10,974
1897	Kaiser Wilhelm II.	
1899	Kaiser Wilhelm der Grosse	
1900	Kaiser Barbarossa.	
1899	Kaiser Karl der Grosse	
	24 Ships ‡	316,212

‡ Three projected.

ITALY.

Launched.	Name.	Displacement. Tons.
	A	18,000
1904	Regina Elena	12,425
1904	Emanuele III	
1907	Roma	
1905	Napoli	
1901	Ra Margherita	13,214
1901	Benedetto Brin	
	7 Ships ‖	94,128

‖ One projected.

OLDER BATTLESHIPS.

GREAT BRITAIN.

Launched.	Name.	Displacement. Tons.
1895	Renown	12,350
1891	Royal Sovereign	14,150
1891	E. of India	
1891	Hood	
1892	Ramillies	
1892	Repulse	
1892	Revenge	
1892	Royal Oak	
1893	Barfleur	10,500
1892	Centurion	
1888	Nile	11,940
1887	Trafalgar	
	13 Ships	170,430

GERMANY.

1891	Brandenburg	9,874
1891	Kurfürst Friedrich Wilhelm	
1891	Weissenburg	
1892	Worth	
	4 Ships	39,496

ITALY.

1897	El Filiberto	9,645
1897	Saint Bon	
1885	Andrea Doria	11,027
1888	Re Umberto	13,637
1890	Sardegna	13,640
1891	Sicilia	13,087
	6 Ships	70,681

UNITED STATES.

Launched.	Name.	Displacement. Tons.
1896	Iowa	11,340
1893	Indiana	10,288
1893	Massachusetts	
1893	Oregon	
	4 Ships	42,204

FRANCE.

1896	St. Louis	11,090
1896	Gaulois	11,105
1895	Charlemagne	11,108
1893	Jaureguiberry	11,637
1893	Charles Martel	11,693
1894	Carnot	11,954
1891	Brennus	11,190
1886	Hoche	10,581
1899	Henri IV	8,807
	9 Ships	99,165

JAPAN.

1894	Tango	10,960
1889	Iki	9,672
	2 Ships	20,632

RUSSIA.

1893	Tria Sviatitelia	13,318
1892	Georgi Pobiedonosetz	10,280
1887	Sinope	10,180
1896	Rostislav	8,880
1890	Dvenadzat Apostoloff.	8,433
	5 Ships	51,091

FIRST-CLASS CRUISERS.

GREAT BRITAIN.

Speed. Knots.	Name.	Displacement. Tons.
25	Invincible	17,250
25	Inflexible	
25	Indomitable	
22½	Minotaur	14,600
22½	Shannon	
22½	Defence	
23	Duke of Edinburgh	13,550
23	Black Prince	
23	Achilles	
23	Cochrane	
23	Natal	
23	Warrior	
22¼	Devonshire	10,850
22¼	Antrim	
22¼	Argyll	
22¼	Carnarvon	
22¼	Hampshire	
22¼	Roxburgh	
23	Monmouth	9,800
23	Kent	
23	Bedford	
23	Essex	
23	Berwick	
23	Cornwall	
23	Cumberland	
23	Donegal	
23	Lancaster	
23	Suffolk	
23	Drake	14,100
23	Good Hope	
23	King Alfred	
23	Leviathan	
21	Aboukir	12,000
21	Bacchante	
21	Cressy	
21	Euryalus	
21	Hogue	
21	Sutlej	
20¾	Amphitrite	11,000
20¾	Argonaut	
20¾	Ariadne	
20¾	Spartiate	
20½	Andromeda	

GREAT BRITAIN—*Cont'd.*

Launched.	Name.	Displacement. Tons.
20½	Diadem	11,000
20½	Europa	
20½	Niobe	
22	Powerful	14,200
22	Terrible	
	48 Ships	584,750

UNITED STATES.

22	Washington	14,500
22	Tennessee	
22	Montana	
22	North Carolina	
22	St. Louis	9,700
22	Charleston	
22	Milwaukee	
22	West Virginia	13,680
22	California	
22	Colorado	
22	Maryland	
22	Pennsylvania	
22	South Dakota	
21	New York	8,200
21	Brooklyn	9,215
	15 Ships	186,595

JAPAN.

21	Ikoma	13,750
21	Tsukuba	
22	Ibuki	14,620
22	Kurama	
21	Aso	7,726
20	Kasuga	7,700
20	Nisshin	
21	Idzumo	9,750
21	Iwate	
20	Yakumo	9,850
21	Adzuma	9,456
21½	Asama	9,700
21½	Tokiwa	
	13 Ships	136,212

FIRST-CLASS CRUISERS—*Continued.*

FRANCE.

Speed. Knots.	Name.	Displacement. Tons.
23	Edgard Quinet	13,780
23	Waldeck-Rousseau	
23	Ernest Renan	13,427
23	Jules Michelet	12,370
22	Leon Gambetta	12,351
22	Jules Ferry	
22	Victor Hugo	
21	Conde	9,856
21	Gloire	
21	Marseillaise	
21	Admiral Aube	
21	Gueydon	9,367
21	Montcalm	
21	Dupetit Thouars	
21	Jeanne d'Arc	11,092
	15 Ships	169,027

ITALY.

22½	Amalfi	9,832
22½	Pisa	
22½	San Giorgio	
22½	San Marco	
20	Giuseppe Garibaldi	7,294
20	Varese	
20	F. Ferruccio	
	7 Ships	61,210

GERMANY.

Speed. Knots.	Name.	Displacement. Tons.
25	F	17,000
22½	E	14,760
22½	Scharnhorst	11,420
22½	Gneisenau	
21	Roon	9,350
21	Yorck	
20½	Prince Adalbert	8,858
20½	Friedrich Karl	
20½	Prinz Heinrich	8,759
19	Fürst Bismarck	10,570
	10 Ships	110,345

RUSSIA.

21	Rurik	15,000
22	Adm. Makaroff	7,900
21	Bayan	
21	Pallado	
20	Gromoboi	12,336
20	Rossia	12,130
	6 Ships	63,166

SECOND-CLASS CRUISERS.

RUSSIA.

Speed. Knots.	Name.	Displacement. Tons.
18	Pamyat Azova	6,734
20	Aurora	6,731
20	Diana	6,630
23	Askold	5,905
23	Bogatyr	6,645
23	Kagul	
23	Otchakoff	
23	Oleg	6,675
	8 Ships	52,610

GERMANY.

Speed. Knots.	Name.	Displacement. Tons.
21	Kaiserin Augusta	5,956
19½	Freya	5,569
19½	Hertha	
19½	Victoria Louise	
19½	Hansa	5,791
19½	Vineta	
	6 Ships	34,245

SECOND-CLASS CRUISERS—*Continued.*

GREAT BRITAIN.

Speed. Knots.	Name.	Displacement. Tons.
19¾	Crescent	7,700
20	Edgar	7,350
20	Endymion	7,350
19¾	Gibraltar	7,700
20	Grafton	7,350
20	Hawke	7,350
19¾	Royal Arthur	7,700
20	Theseus	7,350
19½	Diana	5,600
19½	Dido	
19½	Doris	
19½	Eclipse	
19½	Isis	
19½	Juno	
19½	Minerva	
19½	Talbot	
19½	Venus	
19	Arrogant	5,750
19	Furious	
19	Gladiator	
19	Vindictive	
20	Hermes	5,600
20	Highflyer	
20	Hyacinth	
21	Challenger	5,880
21	Encounter	
	26 Ships	161,810

ITALY.

20	Carlo Alberto	6,396
20	Vettor Pisani	
19	Marco Polo	4,511
	3 Ships	17,303

UNITED STATES.

Speed. Knots.	Name.	Displacement. Tons.
22⅝	Columbia	7,371
23	Minneapolis	
21½	Olympia	5,870
	3 Ships	20,620

FRANCE.

21	Desaix	7,578
21	Dupleix	
21	Kleber	
20	Dupuy de Lome	6,676
19	D'Entrecasteaux	7,995
23	Guichen	8,151
23	Chateaurenault	7,898
18	Bruix	4,735
18	Charner	4,702
18	Latouche-Treville	4,681
19	Pothuau	5,374
23	Jurien de la Graviere	5,595
	12 Ships	78,541

JAPAN.

22	Chitose	4,760
22	Kasagi	5,416
23	Soya	6,500
20	Tsugaru	6,630
	4 Ships	23,306

THIRD-CLASS CRUISERS.

GREAT BRITAIN.

Speed. Knots.	Name.	Displacement. Tons.
25	Boadicea	3,300
23	Amethyst	3,000
22	Diamond	
22	Sapphire	
22	Topaz	
19½	Astraea	4,360
19½	Cambrian	
19½	Charybdis	
19½	Flora	
19½	Forte	
19½	Fox	
19½	Hermione	
19¾	Aeolus	3,600
19¾	Brilliant	
19¾	Indefatigable	
19¾	Iphigenia	
20	Latona	3,400
20	Sappho	
20	Scylla	
19¾	Sirius	3,600
20	Terpsichore	3,400
19	Philomel	2,575
20½	Pelorus	2,135
20	Proserpine	
20	Pegasus	
20	Perseus	
20	Prometheus	
20	Pyramus	
20	Pandora	2,200
20	Pioneer	
20	Psyche	
	31 Ships	99,405

RUSSIA.

19	Almaz	3,285
23	Jemtchug	3,106
	2 Ships	6,391

UNITED STATES.

Speed. Knots.	Name.	Displacement. Tons.
18½	Detroit	2,089
18½	Marblehead	
18½	Montgomery	
20	Albany	3,487
20	New Orleans	
20	Baltimore	4,413
18	Chicago	5,273
19	Newark	4,098
19½	San Francisco	
19	Cincinnati	3,213
19	Raleigh	
24	Birmingham	3,750
24	Chester	
24	Salem	
	14 Ships	45,049

FRANCE.

20	Davout	3,031
20	Linois	2,308
20	Galilee	2,318
20	Lavoisier	2,285
20½	D'Estrees	2,421
20½	Infernet	2,435
19	Alger	4,313
19	Isly	4,406
19¼	Chasseloup-Loubat	3,824
19¼	Friant	3,382
19¼	Pascal	3,951
19	Descartes	3,970
19	Cassard	3,890
19	D'Assas	3,962
19	Du Chayla	3,890
19	Catinat	4,048
19	Protet	4,001
20½	Cosmao	1,923
20½	Forbin	1,935
20½	Lalande	1,968
20½	Surcouf	2,012
	21 Ships	66,773

THIRD-CLASS CRUISERS—*Continued.*

JAPAN.

Speed. Knots.	Name.	Displacement. Tons.
20	Akashi	2,172
20	Suma	2,657
19	Akitsushima	3,150
17	Chiyoda	2,450
17	Hashidate	4,277
17	Itsukushima	
17	Matsushima	
18½	Naniwa	3,700
18½	Takichiho	
20	Niitaka	3,365
20	Tsushima	
25	Sutsuya (ex-Novik)	3,800
23	Tone	3,800
23	X	4,035
20	Otawa	3,000
	15 Ships	52,025

ITALY.

17	Vesuvio	3,373
18	Etna	3,470
17½	Fieramosca	3,534
17	Stromboli	3,836
21	Piemonte	2,597
17	Calabria	2,428
18	Elba	2,690
17½	Giovanni-Bausan	3,277
19	Etruria	2,245
18	Liguria	
18	Umbria	
17	Lombardia	2,351
20	Puglia	2,498
	13 Ships	36,789

GERMANY.

Speed. Knots.	Name.	Displacement. Tons.
20	Gefion	3,712
20	Irene	4,233
19	Prinzess Wilhelm	
21	Gazelle	2,603
21	Niobe	
21	Medusa	2,668
21	Nymphe	
21	Amazone	
21	Ariadne	
21½	Thetis	
21½	Frauenlob	2,657
21½	Arcona	
21½	Undine	
23	Bremen	3,200
23	Hamburg	
23	Berlin	
23	München	
23	Lübeck	
23	Leipzig	
23	Danzig	
23	Königsberg	3,346
23½	Stuttgart	3,396
23½	Nürnberg	
23½	Stettin	
24½	Ersatz Pfeil	
24½	Dresden	3,544
25	Ersatz Greif	3,749
25	Ersatz Jagd	
	28 Ships	88,947

EFFECTIVE FIGHTING SHIPS, BUILT AND BUILDING.

Class.	Great Britain.			United States.			Germany.			France.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships:												
Modern	41	6	47	20	5	25	18	6	24	9	6	15
Older	13	....	13	4	....	4	4	....	4	9	....	9
Total	54	6	60	24	5	29	22	6	28	18	6	24
Cruisers:												
1st Class	44	4	48	14	1	15	7	3	10	11	4	15
2d Class	26	....	26	3	....	3	6	....	6	12	....	12
3d Class	30	1	31	11	3	14	24	4	28	21	....	21
Total	100	5	105	28	4	32	37	7	44	44	4	48

	Japan.			Russia.			Italy.		
Battleships:									
Modern	10	4	14	3	4	7	4	3	7
Older	2	....	2	5	....	5	6	....	6
Total	12	4	16	8	4	12	10	3	13
Cruisers:									
1st Class	11	2	13	4	2	6	3	4	7
2d Class	4	....	4	8	....	8	3	....	3
3d Class	13	2	15	2	....	2	13	....	13
Total	28	4	32	14	2	16	19	4	23

These tables show that the United States had 25 battleships built and building, with 4 older battleships, making 29 in all, while the other principal navies had the following battleships built and building: England, 60; Germany, 28; France, 24; and Japan, 16, on January 1, 1908.

As our fleet must operate in two oceans, and as we have but 29 battleships available, 16 may be assigned to the Pacific and 13 to the Atlantic. In this case the Atlantic should have the older battleships that will be replaced; and, because our ship-building resources on the Atlantic are greater than those on the Pacific, the Pacific fleet should contain the 16 newest vessels. Accordingly, as new ships are built they would go to the Atlantic fleet to re-

place the obsolete vessels and to complete the organization of a fleet of 16 battleships.

Our naval force is not sufficient to give four fleets, but it is urgently necessary that we should build four battleships a year, in order that we may, in the course of seven years, have three fleets of 16 battleships each.

By building four battleships yearly we shall add every year one division of homogeneous units to our fleet. In the course of these seven years we shall have substitutes for the four older battleships, and with a yearly program of four battleships we may gradually substitute the battleships launched in 1898. The *Wisconsin, Alabama, Illinois, Kentucky,* and *Kearsarge* must all be replaced in the fighting fleet, as well as the *Indiana, Oregon, Massachusetts* and *Iowa.*

During the next five years we cannot have a West Indian fleet nor a Philippine fleet. We have one squadron of homogeneous armored cruisers, which will serve as the Hawaiian flying fleet until eight more first-class armored cruisers shall have been built to form another squadron of that fleet.

After having obtained 32 battleships, that is, 16 for the Pacific and 16 for the Atlantic fleet, our ship-building policy should provide for the battleships of the Philippine fleet, and, finally, for the 16 battleships of the West Indian fleet. Our present condition, with but 29 battleships built and building, prevents us from having a relative superiority in number of battleships in any one of our four spheres. It will be a difficult task for us so to maneuver that we may have relative superiority at a point of contact in any one or other of our spheres, and the risk would be considerable. Our policy should be to develop our present force to its utmost and build four battleships a year, so as to give us such superiority that the maintenance of peace will be absolutely certain.

SCOUTS.

For scouts we have 15 first-class or armored cruisers, 3 second-class and 14 third-class, or 32 in all. The 15 first-class include, however, the *Charleston, St. Louis* and *Milwaukee,* and the *New York* and *Brooklyn.* We have 8 armored cruisers in the Pacific fleet, which, as stated, should be the Hawaiian flying fleet. We thus have 24 first-, second- and third-class cruisers, which are available for scouts in the fleets in two oceans, or 12 in each fleet, which is, manifestly, not sufficient.

The scouts of the Atlantic must patrol all that part of the north Atlantic west of the fiftieth meridian, or, roughly speaking, an area defined by radii of 1000 miles from the Atlantic strategic line of force. Twelve scouts spread out fan-wise over the Atlantic, with wireless communication, and in advance of that fleet, and still further advanced to the eastward as the fleet crosses the Atlantic, are all that are available for the Atlantic fleet.

There is a great problem to be solved by the scouting forces of the fleet, who are to patrol over the entire sphere of action. The range of wireless is an uncertain factor, therefore plans for the distribution of the scouts cannot be definitely established. The best organization for covering the largest area in the shortest time must all be worked out by actual experience, that the best plan may be adopted. The number of scouts necessary can then only be fixed. From a casual study of the scouting area for our Atlantic and Pacific fleet it is estimated that one scout will be required for each battleship in the Atlantic, and two for each battleship in the Pacific fleet. With the development of aeronautics, balloons, aeroplanes, etc., may assist scouting.

The Philippine fleet and the West Indian fleet, when established, will also require one scout for each battleship.

In each fleet there should be at least two armored cruisers for scouts, as it may be necessary to drive off an enemy's scouts, and an armored cruiser would be a relatively superior scouting force, and would probably discover the enemy's weak point by which he could be overpowered. Our available scouts can be reenforced to a slight extent by converting merchant steamers in time of war. Such vessels have rendered good service as scouts, and will always be called on in the future; but at best they are makeshifts, and no dependence should be placed upon them in any plans, unless they are in time of peace kept available with gun platforms, equipment and an organized personnel, ready to arm and equip as scouts during war. Such merchant vessels practically belong to the navy at all times, though in the merchant service during times of peace.

The necessity for building more scouts is urgent, though exactly how many scouts should be required is problematical. We must have the fleet of battleships on its strategic lines and ascertain from actual experience and practice what will be required for an adequate scouting force in time of war.

DESTROYERS.

Destroyer flotillas are necessary parts of a battle fleet, and there should be one flotilla for each fleet. We have fifteen of the newest type of destroyers now building, which will provide one flotilla for each of the three fleets. The policy is to build five at a time, and these five large destroyers of exactly the same type should be in the same fleet, making each flotilla homogeneous. The value of destroyers to a fleet was exemplified at the battle of Tsushima, where the Japanese flotilla went in to attack the scattered Russian fleet, after the Russian fleet had been practically defeated.

Our torpedo boats and the destroyers now in service are not well adapted for operating with the fleet, and in case of the Atlantic fleet crossing the Atlantic they would have to be towed by the fleet auxiliaries, which may thereby be prevented from keeping up with the battle fleet. Actual experience with towing torpedo destroyers will throw more light on this subject.

AUXILIARIES.

Each fleet should have a definite number of auxiliaries, which would probably consist of two colliers, one supply ship, one repair ship, one ammunition ship and one hospital ship. Considerable experience has been obtained by the cruise of the Atlantic fleet to the Pacific and Australia, and this valuable experience will definitely decide exactly what auxiliaries are necessary for a fleet.

The foregoing consideration shows that our fighting naval force should consist of three fleets of sixteen battleships, with cruisers, destroyers and auxiliaries, for the immediate future, with a fourth fleet to be established after the completion of the Panama canal. Besides these, we should have the Hawaiian flying fleet of sixteen armored cruisers.

Forty-eight battleships are, therefore, clearly necessary for us to have command of the seas in our four spheres. We probably cannot get a West Indian fleet until four years after the Panama canal shall have been opened, but during that period the Atlantic, Pacific and Philippine fleets will periodically change stations. The Atlantic fleet would go to the Pacific via the Panama canal, while the Pacific fleet would proceed to the Atlantic via the canal, and then the Atlantic fleet would relieve the Philippine fleet. Thus

the three fleets would alternate on the different stations for different periods of time, and occupy the West Indian sphere while in transit.

We cannot expect to command in any one of our four spheres without having these three fleets of sixteen battleships, but by having them we shall be able, at short notice, to reenforce any one sphere which may be the theatre of war with a thoroughly efficient, well trained additional fleet of sixteen battleships from one of the other spheres.

The fighting fleets should be:

	Atlantic.	Pacific.	Philippine.	Hawaiian Flying Fleet.	Total.
Battleships	16	16	16	..	48
Armored cruisers	2	2	2	16	22
Scouts	16	32	16	..	64
Destroyers	5	5	5	..	15
Colliers	2	2	2	2 fast	8
Supply ships	1	1	1	..	3
Repair ships	1	1	1	..	3
Ammunition ships	1	1	1	..	3
Hospital ships	1	1	1	..	3

With our present fleet we must each year build 4 battleships, 2 armored cruisers, 4 scouts and 2 auxiliaries to have the requisite strength to give us command of the sea in our four spheres.

After the Panama canal shall have been opened we will need the West Indian fleet of 16 battleships, 2 armored cruisers, 16 scouts, 5 destroyers and 6 auxiliaries in addition to the above.

We must have this ship-building policy for building up our fleet by American labor, in American ship-yards. We are debarred by our policy from purchasing from European ship-yards. We see other nations having battleships built in foreign private yards and disposing of them to other nations at a critical time, but we want American-built ships for our navy, and with them our personnel will maintain its glorious record of victories.

NAVAL BASES.

The naval bases are the navy yards where our battleships can obtain coal, supplies, repairs and equipment to maintain them at the highest standard of fighting efficiency. The naval base of New York, including the navy yards at Brooklyn, Philadelphia, Newport and Boston, is the chief Atlantic base. The navy yard

at Norfolk, with that of the gun factory at Washington, is the second Atlantic naval base. These two bases (New York and Norfolk) are easily accessible from the Atlantic strategic line of force (Nantucket to Hatteras). The navy yard at Key West is the naval base for the Gulf of Mexico and West Indies, having Guantanamo and Porto Rico as a part of its range. Key West, Guantanamo and San Juan are accessible to the Key West-Porto Rico strategic line of force controlling approaches to the Gulf and Caribbean.

For the protection of the Panama canal, a naval base should be established at Chiriqui Lagoon, which is admirably situated about 120 miles from Colon. It has, beyond all question, the largest and finest harbor in the world, which is capable of harboring all the navies of the world, and, at the same time, it is easily defended by fortifications, so that the navy would be foot-loose with its use as a naval base for the protection of the Panama canal.

The naval base at Puget Sound is admirably situated for the northern base of the Pacific fleet. San Francisco, with Mare Island, is the southern base for the Pacific fleet.

Honolulu, with Pearl Harbor, is the base for the Hawaiian flying fleet, and Manila and Olongapo the bases for the Philippine fleet.

Besides the above-mentioned navy yards and naval stations we have a number which are not suitable as naval bases, and which, therefore, should be abandoned. New Orleans, Pensacola, Charleston, Port Royal, Portsmouth, N. H., and Culebra are not suitable for naval bases. Much of the equipment and machinery plant of these navy yards, not suitable as bases, should be transferred to the other navy yards which are in need of development, such as Guantanamo, Key West, Chiriqui Lagoon and Pearl Harbor. The cost of maintaining the foregoing yards is an unnecessary expense, and, by abandoning them, the other necessary naval bases may be built up without much expense. The navy yards at New Orleans and Pensacola are remote from the scene of action, since the Gulf of Mexico is practically an inland American lake. The independent Republic of Cuba is under American protection, and cannot harbor a foreign fleet hostile to the United States. When Cuba belonged to Spain there was a necessity for having yards at Pensacola and New Orleans, but this necessity no longer exists.

The navy yard at Charleston, S. C., has no advantages as a strategic site, it is not a salient point, and it has no special resources as to skilled labor, industries and transportation facilities to commend it for a site as naval base. There are no advantages by which the fleet could be benefited in its operations to command the Atlantic. The Atlantic fleet would always be nearer Norfolk on the one hand, or Key West on the other, than to Charleston, and, therefore, in this respect, Charleston has no advantages as a base at a salient point to make our navy foot-loose.

Portsmouth, N. H., has some advantages, but it is not on a strategic site; it is too near the navy yard at Boston. However, its deep harbor and docking facilities make its retention necessary until ample docking facilities shall have been provided at other bases.

THE COAST DEFENCES.

The object of coast defences is to protect the coast from a foreign naval force. Our coast fortifications must engage the enemy's vessels. Manifestly these should be located where the enemy's fleet might come. Coast fortifications remote from the sea are, therefore, of no use—such as Fort McHenry, Fort Monroe, Fort Schuyler, and many others which are now garrisoned by the coast artillery. We need fortifications to protect the salient points, and to make our navy foot-loose.

Fortifications, therefore, are needed to protect the approaches to our naval bases. We need fortifications at the approaches to New York harbor, in Long Island and Vinyard Sounds, in Massachusetts bay, in the entrance to Delaware bay, and to command the approaches to the entrance to Chesapeake bay, which fortifications should be adequate to protect the bases of the Atlantic fleet.

The Straits of Florida should be absolutely commanded by fortifications and Navy-Coast-Defenders to completely close the Straits. Fortifications along the north shore of the Straits of Florida should be built on the outer reefs, seven miles south of the Florida Keys, extending at intervals from Miami to Tortugas, with Key West as the center. Fort Taylor, at Key West, does not command the approaches to Key West harbor. The armament at Fort Taylor should be transferred to fortifications to be built along the outer reefs. These forts and batteries will command the route close to the reefs that west-bound vessels in the Straits must take to avoid the strong currents of the Gulf Stream.

Fortifications are needed at Guantanamo, at San Juan, at Porto Rico, and, especially, at Chiriqui Lagoon, for the protection of those bases.

Fortifications elsewhere on the coast, that do not protect approaches to bases, are not needed. Such fortifications will not be attacked. It would not pay an enemy to risk an attack on any of our present fortifications not at the enumerated naval bases, because the effect of any such attack would have no influence upon the fleet. As long as our fleet has command of the sea the enemy's fleet dare not venture to attack minor places before encountering our fleet. It will be perfectly safe to dispense with coast fortifications at all points except those which have been enumerated as necessary to protect the approaches to our naval bases.

The fortifications at Gulf ports, such as Galveston, New Orleans, Pensacola, Mobile and Tampa, are of no use, provided the fortifications and Navy-Coast-Defenders completely command and block the Straits of Florida and the Yucatan channel. An enemy would obtain no advantage by attempting to enter the Gulf of Mexico. Such an attempt could never be made without the knowledge of the Atlantic fleet, and adequate defences at the Straits of Florida and the Yucatan channel, with available Navy-Coast-Defenders, would invariably give us relative superiority, when reenforced by the Atlantic fleet, should such an attack be attempted. There would be too little for any enemy to gain for him to send a formidable fleet to attack our Gulf ports, while the risk of his defeat would be enormous. The Gulf ports can, therefore, be safely left to the defences at Key West and the Navy-Coast-Defenders in the Yucatan channel and Straits of Florida.

We need coast defences at Puget Sound, San Diego, and the Golden Gate. These Pacific coast fortifications should be of the most formidable character, and should extend as far to seaward as possible, to command approaches. We need fortifications for the naval base at Honolulu, and, also, elaborate fortifications at the approaches to Manila bay, at Olongapo, at the terminal of the railroad at the north end of the Island of Luzon, and at San Barnardino Straits.

NAVY-COAST-DEFENDERS.

Besides the fighting fleet, the navy has a considerable force of other vessels: torpedo boats, gun boats, cruisers and converted vessels which are not suitable as scouts, monitors, obsolete and

older battleships, and submarines. The perfection of submarines is as yet problematical, and so long as it is problematical they cannot be depended upon as one of the reliable components of the fighting force of the navy. Submarines are, therefore, to be used with the Navy-Coast-Defenders, co-operating with the coast artillery and marines, in the defence of our naval bases. The marines having been separated from service afloat in the fighting fleet and assigned to duty at naval bases, form an available trained force to co-operate with the coast artillery corps and the Navy-Coast-Defenders in the coast defence.

BUREAU OF COAST DEFENCES.

Co-operation of the navy, marines and coast artillery, three different organizations under both the War and Navy Departments, necessitates much closer relations between them than we have had hitherto. A separate bureau of coast defences should be established to take full control of the coast defences. The bureau should be endowed with all administrative authority over the three branches of the service assigned to it. The personnel of officers and men belonging to the army, navy and marine corps detached to service in coast defences and in the Navy-Coast-Defenders, should be under the exclusive orders of the bureau of coast defences until detached from such service by either the War or Navy Department with the knowledge and consent of the bureau of coast defences.

The materiel of the coast defences and Navy-Coast-Defenders, and all that pertains to supplies and accounts, etc., must, however, remain, as at present, under the direction of the War and Navy Departments, respectively, for the maintenance and repair and preservation of this materiel. The bureau of coast defences should have full control of all the coast defences, and should apportion the available forces in different districts and possessions as may be deemed advantageous. The bureau of coast defences should be composed of the chief of the coast artillery corps, a flag officer of the navy, and the major-general-commandant of the marine corps. The bureau should distribute the available forces in the different districts and detail the officer to command each coast defence district. The district commander should be an officer of rank of either the navy, coast artillery, or marine corps. Where fortifications constitute the chief feature of the defence, the com-

mandant should be an officer of the coast artillery; and where the Navy-Coast-Defenders have the principal rôle, with accessory coast defence work, a naval officer should command; and where considerable inland protection is necessary, a marine officer should command. For example, it would be desirable for a coast artillery officer to command the coast defence district of New York, while a naval officer would command at Key West, to control the Straits of Florida and the Yucatan channel, and a marine officer would be best suited to command on the Isthmus of Panama. The commanding officer in each coast defence district should have three aides, one from each of the three branches of the service, and through whom he would transmit special orders to the detachment of that branch of the service to which that aide should respectively belong.

The prescribed limits of this essay will not permit of a categorical description of the needs of each naval base, but the assignment of a portion to each of our four spheres of action will indicate a good use for the available Navy-Coast-Defenders.

It will be possible to assign the following to the naval bases in each of our four spheres:

	Older Battleships.	Monitors.	Old Destroyers.	Torpedo Boats.	Submarines.	Gunboats.	Converted Yachts.	Tugs.	Army Mine Planters.
Atlantic	2	2	..	10	6	8	6	12	1
West Indian	4	4	6	6	4	8	6	10	1
Pacific	2	2	5	10	4	8	6	10	1
Philippine	2	2	5	10	5	16	6	10	1
Total	10	10	16	36	19	40	24	42	4

The number of vessels available is, therefore, not adequate for all demands. Perfect command of the Straits of Florida, Yucatan channel, and the base at Chiriqui Lagoon will require at least double the number of older battleships, but this number will be increased during the next ten years by acquisition of battleships that become 15 years old in that time.

The other components of the force of Navy-Coast-Defenders will, likewise, be increased from time to time as cruisers, scouts, etc., become unsuitable for service with the fighting fleet, while still serviceable for ten or more years as Navy-Coast-Defenders.

No vessels should be built for Navy-Coast-Defenders. All new

vessels must be designed and built for the fighting fleet. Indeed, *perfect command of the sea obviates all necessity for any coast defence. If we command the sea, no foreign naval force can attack our coasts.*

But, inasmuch as the game of war may require temporary absence of the fleet from the strategic lines of force, it is well to have some protection, that our fleet may not return to find its base closed at a critical time, when scarcity of fuel, ammunition, etc., would cripple the fleet.

The Atlantic coast between Hatteras and Key West needs no defences beyond those now existing. The importance of our inland coast waterways and canals, which are being developed to give a continuous inland water route from Key West to New York and Boston, cannot be over-estimated. The inland route between Norfolk and Boston will be very valuable for the concentration of light draft Navy-Coast-Defenders at any particular point along the coast where they may be needed to protect the approaches to our naval bases. South of Norfolk along to Miami, no defences are needed, because that coast will never be attacked, except by a weak raiding force that will easily be repelled by Navy-Coast-Defenders that could be sent by the inland water route to any threatened point.

It is simply a waste of public money to build any elaborate fortifications anywhere on the Atlantic coast between Norfolk and Miami, because no enemy could ever find it an advantage to attack any part of that coast, especially if the Atlantic fleet was able to attack him, and more especially if the Atlantic fleet had been destroyed and driven to shelter at its bases, in which case the enemy's attack would certainly be directed upon the approaches to the Atlantic bases: Chesapeake bay, Delaware bay, New York harbor, Long Island Sound, etc., where their successful effort would have a decisive effect for the enemy's cause.

Our bases and their approaches must be protected. We can not have *perfect command* of the sea without having, at the same time, an absolute certainty that our fleet can have *free access* to our naval bases. Perfect command of the approaches to our bases is an essential element of the proposition to have perfect command of the sea. All other coast fortifications are unnecessary.

In all other departments of human effort we have found it necessary to change our plans and views; and old fortifications

that were built years and years ago, to meet the circumstances of that time, though modernized, do not answer at present, because of their locations. We have changed the armament, and now that the Gulf of Mexico has become an inland lake, and the ports in Chesapeake bay and Delaware bay are no longer exposed to an attack by an enemy's fleet, there is no necessity for any fortifications in the Gulf and within these bays; they are only necessary at their entrances and approaches.

All unnecessary existing coast fortifications should be sold or turned over to the militia of the several states in which they are located. The coast artillery corps should be stationed at the necessary sea-coast defences where there is a possibility of an attack by a foreign naval force. The defences at approaches to all our bases must be greatly enlarged and strengthened, as enumerated. The personnel strength of the coast artillery corps is inadequate to properly man the necessary coast defences.

The assignment of the marine corps to duty at the naval bases will afford considerable improvement in the personnel strength, but that is inadequate for properly training and maintaining the necessary coast defences, even after the withdrawal of garrisons from old forts where no hostile ship would ever come. The coast artillery corps must be drilled in time of peace to be prepared for proper defence in time of war, when it would be reenforced by at least double the number of untrained volunteers.

There must be no idle reserve, unless the militia and volunteers, to be called out in time of war, can be considered as such. No vessels of the navy should ever be placed in reserve. All must belong to the fighting fleet as long as suitable to serve therewith, or to the Navy-Coast-Defenders. Vessels not adapted to either should be sold, unless still serviceable for duty as receiving ships, or for naval militia. Naval training should be given in efficient ships of the fleet or Navy-Coast-Defenders. Men should be trained in efficient ships, and not be obliged to learn that which has been discarded.

Efficient coast defence is assured by intimate co-operation of the coast artillery corps, the navy and marines at the naval bases. This intimate co-operation will be most strikingly manifested at the great military and naval base commanding the Straits of Florida. Elaborate fortifications on the outer reefs, south of the Florida Keys, will cover the entire inland channel from Miami to Tortugas—150 miles, with a width of from 5 to 7 miles—

affording protected anchorages for fleets of battleships and cruisers, torpedo flotillas and schools of submarines to operate and command in the Straits of Florida and Yucatan channel, thereby completely closing all approaches to the Gulf of Mexico, which becomes a protected inland American lake, that needs no fortifications at any of its ports.

THE PERSONNEL.

An adequate force of officers and men must be provided for this fleet of fighting ships, the naval bases and Navy-Coast-Defenders. To ascertain the requisite number of officers and men, it will be proper to assign flag and commanding officers for the respective fleets, bases and ships, and from the existing proportion of staff and junior officers determine the number by which the entire navy must be officered.

The senior officer of the navy should be the admiral of the navy, who should direct its operations through the general board; or, in case that is not conceded, the chief of the bureau of navigation, acting for the Secretary of the Navy, should command with the rank of vice-admiral. The chief of the bureau of navigation is now the chief of the navy personnel, and directs the movements of ships and the personnel. His orders, as those of the Secretary of the Navy, are given in accordance with the existing policy and plans of campaign, assisted by the advice of the general board, of which he should be a member.

The commander-in-chief of each of the three fleets of battleships, and, also, of the Hawaiian flying fleet, should have the rank of vice-admiral. This rank is essential to the organization of a fleet. It is the proper title for the commander of such a force, and necessary for the exercise of naval command. It might be possible to designate the commander of a company of infantry as an ensign, but it is not customary; he has always been called a captain, and always will be so designated. We have rear-admirals to command squadrons and divisions, and it is just as necessary to have a distinction in rank between the commander of a fleet and the commander of a division as it is in the army between commanders of armies and commanders of brigades. If we need fleets, the necessity for officers of proper rank to command the fleets is equally urgent. Rear-admirals Evans, Thomas and Sperry performed the duties of vice-admirals and should have had the title. The lack of the title did not lessen their authority, nor

impair their efficiency, except that it was an imputation that the American people did not want to do justice to faithful servants. The fact is, that our people have not fully realized that the commander of a real fleet does the duty of a vice-admiral, or they would have no objection to designating him by a title descriptive of his duty. Only recently have we had a real fleet, and now that it is necessary to have the duties of a vice-admiral performed it is only just to claim that the officer charged with the duty of a vice-admiral shall have the rank.

The following officers are required:

Admirals	1
Vice-admirals	5
Rear-admirals:	
To command 4 divisions of 3 fleets of battleships	12
To command 4 divisions of Hawaiian flying fleet	4
For chiefs of bureaus of ordnance, steam engineering and equipment	3
For commandant of navy yards at New York, Boston, Philadelphia, Norfolk, Washington, Key West, Mare Island, Puget Sound, Honolulu, Cavite and Olongapo	11
Superintendent of the Naval Academy	1
President of the War College	1
Examining and retiring boards	2
Boards of inspection	2
Lighthouse board	1
Superintendent of the Naval Observatory	1
Bureau of coast defences, or joint army and navy board	1
Chief intelligence officer	1
Commandant of naval training station, Great Lakes	1
Commandant of naval training station, Newport, R. I.	1
Total	42
Captains:	
To command 48 battleships	48
To command 22 armored cruisers	22
As chief of staff in 4 fleets	4
To command 10 battleships (naval coast defenders)	10
Captain of yard at New York, Boston, Philadelphia, Norfolk, Key West, Mare Island, Puget Sound, Honolulu, Cavite and Olongapo	10
To command torpedo station, Newport, R. I.	1
To command receiving ships at stations	8
General inspector of ordnance	1
General inspector of equipment	1
General inspector of steam engineering	1
Commandant at Guantanamo	1
Commandant at San Juan, Porto Rico	1
Commandant at Guam	1
Commandant at Samoa	1

Commandant at naval training station, San Francisco	1
Commandant at Chiriqui Lagoon	1
As assistants to chiefs of bureau of navigation, ordnance, steam engineering and equipment	4
Member of general board	1
Members of two boards of inspection	2
Member of lighthouse board	1
Judge advocate general of the navy	1
Naval attachés abroad	5
Commandant midshipmen Naval Academy	1
Bureau of coast defences, or joint army and navy board	1
Members of examining and retiring boards	2
One inspector of ordnance at the navy yards at New York, Boston, Philadelphia, Norfolk, Key West, Puget Sound, Mare Island, Honolulu, Cavite and Olongapo	10
One equipment officer at each of the above yards	10
One head of department of steam engineering at each of above yards	10
Total	160

Commanders:	
To command 64 scouts	64
To command 20 fleet auxiliaries	20
To command 10 monitors (Navy-Coast-Defenders)	10
To command 20 of the largest gunboats and converted yachts	20
As executive officer of 48 battleships	48
As fleet ordnance officer in 4 fleets	4
As fleet engineer in 4 fleets	4
As chief of staff to 8 squadron commanders	8
Adjutant to the Secretary of the Navy	1
Adjutant to the Assistant Secretary of the Navy	1
Office of judge advocate general	3
Bureau of equipment	4
Inspection under bureau of equipment at private establishments	3
Naval Observatory	1
Hydrographic office	1
Bureau of navigation	2
Recruiting duty	3
Naval Academy	7
Examining board	1
Bureau of ordnance	2
Inspectors of ordnance at 10 private establishments	10
Total	217

The duties required in all the above stations must be performed by officers of flag and command rank. Efficiency cannot be obtained unless the duties are performed by officers having the requisite qualifications, experience and rank. The naval organization requires that officers designated to perform the duties of

the above stations must have the requisite authority that pertains to the rank of flag officer and commanding officer respectively.

For junior officers, it is not necessary to go into elaborate details of each and every assignment. The number of junior officers bears a relative proportion to those of flag and command rank, and from this the strength of the line officers should be:

Admirals	1
Vice-admirals	5
Rear-admirals	42
Captains	160
Commanders	217
Lieut.-commanders (the sum of captains and commanders)	377
Lieutenants	600
Lieutenants, junior grade	700
Ensigns	800
Total	2902

As the navy is established for the purpose of fighting foreign naval enemies, its adequacy for contending against such a foe suggests a comparison of the personnel sea strength. The following table, published by the Office of Naval Intelligence, shows the personnel strength of the principal naval powers January 1, 1908, to which there is prefixed the warship tonnage or such naval powers for comparison.

	England.	France.	Germany.	Japan.	United States.
Warship tonnage	1,821,610	836,112	680,660	451,320	771,758
RANK.					
Flag officers	96	45	34	55	18
Captains and commanders	618	360	299	245	182
Other line officers and engineers	3,289	1,874	1,732	1,571	751
Total line officers	4,003	2,279	2,065	1,871	951
Medical officers	521	409	234	306	282
Pay officers	537	187	189	263	210
Warrant officers	2,007	1,484	2,033	1,064	638
Enlisted men	98,973	51,926	42,400	41,070	34,062
Total navy personnel	106,041	56,285	46,921	44,574	36,143
Marine officers	490	....	86	....	277
Enlisted men (marines)	17,526	....	1,230	....	8,147

The table shows, that while we have nearly one-half the warship tonnage of England, the number of our line officers is less than one-fourth that of the English navy. England has more than twice as many line officers per warship tonnage. The total strength of our navy personnel of officers and men is only one-third that of the British navy. These facts show that it is absolutely necessary to increase our personnel strength for the present materiel, and absolutely necessary to more than double it for the materiel herein shown to be necessary. With such inferiority in the strength of our navy personnel it will almost be a miracle for us to have relative superiority in any case.

It also appears that we have more medical and pay officers than Germany; and if the numbers in these corps be doubled, the number will suffice. In order, therefore, to be as conservative as possible, the following strength of the navy personnel is necessary for the proposed materiel:

Flag officers	48
Captains and commanders	377
Other line officers	2,477
Medical officers	564
Pay officers	420
Warrant officers	1,276
Enlisted men	68,124
Marine officers	554
Enlisted men (marines)	16,294

the numbers of all in the above list, except the line officers, being double the number at the present time.

The shortage of officers, even with our present force of battleships, is a tremendous handicap to our efficiency. For lack of officers, many ships are laid up in reserve: all are short of officers, and all officers are obliged to do double duty. Line officers, especially, are subjected to arduous work, one often being called on to do the duties of three officers, as executive, navigator and chief engineer, of a ship, because no more officers are available to be detailed to that ship.

Fortunately, our officers are competent as line officers and engineers, a condition that does not exist in any other navy, and which is evidence of individual superiority. These qualifications of our officers, however, cannot supply all the deficiencies in this shortage, and the conservative increase outlined is absolutely necessary.

In addition to this increase in the personnel to be authorized now, Congress should hereafter provide that whenever a new ship is built the *additional personnel of officers and men for the complement of this ship shall likewise be authorized.*

Considering our present and the proposed strength of personnel, it is apparent that it will be impossible to fill all the grades with experienced officers immediately. It will be necessary to proceed gradually, in order to preserve a proper balance and relative strength in each grade.

Promotion to all grades above that of lieutenant should be limited, so that there shall be the same percentage of vacancies in the list of lieutenants as in the list of lieutenant-commanders, and the same rule should apply to all higher grades.

The authorized number of naval constructors, civil engineers, professors of mathematics, and chaplains, must also be doubled to provide the best materiel and trained personnel for this proposed naval strength. Their services are absolutely necessary, and their present numbers are certainly inadequate for any increase in the navy. Their number should, likewise, be increased gradually, leaving the same percentage of vacancies in each grade, to avoid having the higher grades filled by young men, who would block deserved promotion in the future.

Our present laws for retirement should be modified, and especially in regard to the retiring age of 62. It is difficult to understand why naval officers must retire when 62 years old, while the army officers retire at 64 years. We have lost many of our most brilliant officers by forcing them to retire while capable of rendering most valuable service. Now, while the personnel is to be so largely increased, is the time to rectify this, and to change the law to retire at 64 years. This should apply to all flag officers, or, at least, to the grade of vice-admiral.

The shortage of officers requires the services of retired officers, whose employment on active duty is permitted until 1912 only. The services of retired officers will be needed long after that period, and all retired officers with less than 40 years' active service should be obliged to serve on active duty as long as they are physically and professionally qualified, and those with 40 or more years' service should be permitted to continue on active duty as long as they desire and are still qualified. Under the Personnel Act of 1899 many officers have been retired who are still capable of rendering good service, and their services are needed.

There is no private industry nor profession the pursuit of which will qualify any one for the duties of a line officer of the navy. All line officers must be graduated from the Naval Academy, or be promoted from the enlisted men of the navy when qualified. The necessity of educating very large classes of midshipmen at the Naval Academy is urgent to supply the number required for the navy, as herein shown. We need 300 graduates every year for this largely increased strength of personnel, and as the same proportion of vacancies by death, resignation, etc., will prevail, the actual number recruiting from the Naval Academy must be greater to maintain this strength.

The navy and coast defence herein demonstrated to be necessary is not advocated to wage war over the world. This force is only that which is urgently necessary for our defence. The fact that our fleets must be able to cross the ocean is not to be regarded as any indication of such a policy. Indeed, American policy is *utterly* opposed to conquest of any territory beyond the seas. The acquisition of the Philippines is sincerely regretted by the American people, but its possession involves the duty to provide for its protection, and having expended millions of wealth and sacrificed the lives of thousands of our citizens we can not shirk our responsibility to protect these islands until they can protect themselves.

These fleets are not a menace, but solely for protection. In any defensive campaign, sorties are necessary, and so our fleets must be capable of carrying out offensive-defensive operations, or sorties across the sea if necessary, in order to command the seas in our four spheres with relative superiority at the point of contact.

The three fleets of battleships and the Hawaiian flying fleet, with all appertaining to these four fleets, must be supplemented by the West Indian fleet of battleships after the Panama canal is opened, for its protection.

The building and maintenance of these fleets will require large appropriations, but this will not be greater than the ordinary cost of insurance which it provides. The expense of building these fleets will be largely covered by the sale of the land, buildings, and other property of the five navy yards that should be abandoned, while the sale of the territory of many of the old forts in and near large cities will provide an additional reduction in the expense required to provide an efficient navy and proper coast defence.

The world must *know* that we have these fleets and such a thorough protection. This knowledge must not be merely printed reports, but positive facts, repeatedly demonstrated by actual exhibition of the fleets in all parts of the world.

Secrecy in regard to preparedness for war is impracticable, since war materiel must be handled to train personnel. Efforts to conceal facts about materiel indicate consciousness of weakness and tend to defeat our only object, viz: That our preparedness for war shall deter nations from making war against us. Preparedness for war insures peace. The police of New York City frequently parade to deter disturbance of the peace, and, exactly on the same principle, our fleets must be seen, that international peace may not be disturbed.

Everything can not be adjusted by arbitration. Is it just to exclude Asiatics and demand admission in Asia for American missionaries? Yet we must spread the gospel in Asia, and, also, protect our labor. Will Americans submit to any decree of the Hague Court that would decide that we must either admit Asiatics or exclude American missionaries from China? Such questions, and many others of similar character, are constantly arising, and we must be properly and efficiently armed to keep our palace and goods in peace.

Peace societies defeat their own object when they demand disarmament. It is the law of nature, that the strong man must be armed to have peace, and our Savior still further teaches in the verse of Holy Scripture which follows that used as the motto of this essay, that he must be stronger than his foe to maintain peace.

DISCUSSION.

REAR-ADMIRAL C. H. STOCKTON, U. S. NAVY.—This is an interesting paper upon a live subject, and whether intended or not is a sad satire upon our system, or rather, want of system, of establishing navy yards and naval stations. This procedure in the locating of navy yards is an evidence of the strength of sectionalism *vs.* patriotism.

A strong and active member of Congress, or an energetic and capable naval officer in charge of a naval station, often originates and establishes a navy yard or keeps alive by an unnecessary expenditure of money a station which ought not to be established, or if established should be allowed to die out and be abandoned.

Nowhere is this matter more strongly exemplified than in the Gulf of Mexico and its adjacent waters. Pensacola, the Dry Tortugas, New

Orleans and Key West, each in turn has had its day and predominance and now to-day all drain alike from the public's treasury and increase the expenditure unnecessarily under the head of the Naval Appropriation Act.

I do not intend by this statement to impugn the sincerity or intelligence of the extremely conscientious and honest officer who has written the essay which is the subject of these remarks. Much that he says in favor of Key West, especially with respect to its stragetic position, is true; much that he says as to the uselessness of New Orleans and Pensacola is also true, but the subject of the Gulf should be treated as a whole, definitely regulated by the General Board, as a whole, in connection with the naval policy of the United States of America.

Key West is a point that cannot be ignored; every war has forced it into a position of utility and value; but the inherent defects of the place as a harbor, as almost impossible of defence, have also become evident and made known its limitations. Its position as an advanced base has been strengthened by its future railway possibilities, but the weakness of this thread of communication, the great difficulty of preserving it intact in face of an active and strong navy shows also the limitation in that respect. Year by year the place becomes less valuable as a deep water harbor and as a place where prolonged repairs can be effected with that safety from attack and disturbance which is so essential in modern times.

The Dry Tortugas appears also in the paper of Commodore Beehler and has been a subject in the past of much useless expenditure of money in the way of fortifications and coaling plant. Let us hope that there will be no successful attempt to revive it as a station and place for expenditure. It is not necessary for our own navy and as a base and station for an enemy it can be eliminated if we have the sea power which will give control of these waters to our own forces. Without that sea power in these days of colliers, and oil as a fuel, the Tortugas is only one of several points that can be used for renewing the necessary fuel in the Gulf of Mexico.

With the exemption of unfortified harbors from bombardment and attack, with the rapidity of movement and attack possible from the supremacy of a war lord and his general staff, with the adoption of oil as main or auxiliary fuel, with the increased speed and self-reliance of battleships, with their attendant auxiliaries and with the growing concentration of the great navies in the hands of a few powers, or a few, very few, groups of powers, I think the whole naval policy of the United States needs a thorough and systematic study and development. Let us hope that such study and development is under way and can be made effective.

Arbitration, as the author of this paper suggests, has its limitations. No State will relinquish or ought to be asked to relinquish its national vitality and independence to a central governing body to which it must tamely submit, no matter how wide its range or how vital its decisions may be with regard to the nationality, the independence or the interests of the States concerned. I cannot think, however, that the future will bring an emasculation of nationalities, men without countries, the extinction of patriotism, or a resultant single dominant ruler of the world, as in the days of the Roman Empire.

Until this occurs, strong navies, and strong navies alone, are in order. For weak navies, no reason or excuse exists, except as auxiliaries to dominant allies.

FIRST LIEUTENANT PAUL D. BUNKER, U. S. COAST ARTILLERY.—Commodore Beehler's solution of the problem of coast defence, proper, does not seem to be as good as the one now in force. The subject cannot be dismissed in a few paragraphs, nor even pages. The scheme now entertained by those in authority involves the fighting of the guns of the fort by its garrison, aided if possible by national guard coast artillery companies, and also the land defence of the forts by national guard troops from the vicinity. Here there is no division of authority, with its resulting evils. The district commander knows what is expected of him, he has full control over his district, and is responsible directly to the chief of coast artillery. If the enemy has landed and is not attempting a serious attack with his ships, he sends part of the coast artillery troops to aid in the land defence.

Division never produces strength. It is better to have one man responsible for a thing than several. Hence let us have one man, not three, responsible for the proper fighting of our forts. I am strongly of the "one man" idea, as contrasted with the idea of control by a board. There can be no division of authority if efficiency in results is demanded. The "Bureau of Coast Defences" would not work, would not produce efficient results. The navy, marines and coast artillery all have their separate and distinct work, and efficiency would not be attained by any attempt to combine their functions. The attack upon the enemy's ships, whether by our battle fleet or by "navy-coast-defenders," should be under the command of a naval officer, and he should not be a fortress commander. Similarly, the defence of a coast fort should in all cases be intrusted to an officer of the coast artillery, not a naval or marine officer.

Now it is not contemplated to keep the coast artillery tied down to its heavy guns, regardless of the fortunes of war. The artillery is trained to take the field, and circumstances can easily be imagined where this will be highly important.

We cannot assume that we shall always have the command of the sea, for if we did, there would be little use for the army at all. Supposing that the enemy had succeeded in making a landing on our shores, it would be essential to concentrate all available troops against him in the least possible time. This is where the coast artillery would have to partially abandon their forts, which would have necessarily decreased in value, and take the field, either as infantry or to handle heavy movable guns. It would also be one point where the Bureau of Coast Defences would break down. The War Department must have absolute control over all land forces, and must be able to move troops at will, without being hampered by a "Bureau of Coast Defences." This should be as apparent a fact as that the Navy Department should have control over all war ships, whether used for harbor defence, or as parts of the battle fleet.

The idea of delegating to the corps of marines the duty of providing for the land defence of our forts is a good one. They have an enviable reputa-

tion for being ready at any hour of the night for duty in any part of the globe. Being stationed at our seacoast forts, it would be very easy for an expeditionary fleet to embark them for any sudden duty that unforeseen trouble demanded in ordinary times of "peace." Also, a well-trained body of men like this would be ideal as a land defence for the forts. However, the whole strength of the marine corps would be but a drop in the bucket, when it comes to provide a land defence for the most essential bases, to say nothing of the number that would be required elsewhere. Hence, if the marine corps has not sufficient personnel, why fritter away their strength by scattering them in this fashion?

Now there are several fundamental propositions concerning the functions of the coast defence that must be always kept in mind. One of these is: *a coast fort has completely fulfilled its functions when it has made an enemy abandon a direct attack by sea, and compelled him to adopt either a land attack or a combination.* That is, when it has made the enemy land his forces. It is not necessary for the fort to have inflicted any damage upon the ships of the enemy. In fact, it seems to be fairly well understood that a direct attack by ships on a modern seacoast fort will be a very rare occurrence, especially if it is known that the fort possesses an efficient mining system. Hence it is only reasonable to suppose that the enemy will attempt to land, as quickly as possible, and as near some strategic point as possible. As we must not assume that we shall always have command of the sea, it is seen that these possible landing places of the enemy must be protected. It is for this reason, partly, that all of our harbors, that would be useful to an enemy for this purpose, are fortified to a greater or less extent. Now it is entirely possible that our enemy, relying on the weaknesses of a popular government, would attempt to land near, and operate against some of our great commercial centers, thus producing in the masses a clamorous demand for peace. This same course of action, in our Civil War, was not without effect, and if our navy should temporarily or locally lose command of the sea, it is doubtful what would result from a powerful attack of this kind. Hence it is seen that the locations of some of the forts that Commodore Beehler condemns, are not altogether bad. Naval bases are about the most important thing we can protect, but we must also prevent the enemy from occupying a good harbor, with railroad and docking facilities, where he can establish a base of operations, should our sea supremacy temporarily fail. (The piers at Dalny were of inestimable advantage to the Japanese in their operations against Port Arthur.)

Fort Monroe, for instance, is of very great importance, and until "The Capes" are fortified, it is the sole protecting barrier to the navy yard at Norfolk and the dry-docks at Newport News, to say nothing of the great railroad systems lying but a short distance away.

Thus we must remember that this is a government "by the people," and if war should break out, every seacoast city would put up such a clamor for protection that very important operations might be endangered, were not every harbor of importance fairly well protected.

The advantages gained by fortifying the outer Florida Reef would hardly seem to warrant the necessary expenditure. Key West itself is strongly

fortified, and with a little additional expense would be impregnable. With the judicious use of mines, it is extremely doubtful if any naval commander would attempt a direct attack. No more than this could be obtained by fortifying the whole line of keys.

Key West forms a "point d'appui" for the operations in the whole Gulf of Mexico, and if we had another at Chiriqui Lagoon, fulfilling the same function at the other approach to the Gulf (the Yucatan Channel), there would be little to fear from an enemy operating in this direction, for to pass either base would be to expose his lines of retreat and of communications to destruction. However, of course, the harbor at Key West would have to be properly "improved" before this most desirable result could be obtained. Yet even if these two bases were put into splendid condition, it would seem only proper to protect the great artery of the Mississippi as a second line of defence.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

SOME REMARKS CALLED FORTH BY THE ABLE ESSAY OF PAY INSPECTOR MUDD— AND A PLEA.

By COMMANDER JOHN HOOD, U. S. Navy.

After reading an essay appearing in the March number of the INSTITUTE on the "Reorganization of the Naval Establishment," by Pay Inspector J. A. Mudd, an essay full of excellent matter and well-thought ideas and suggestions, though perhaps expressed rather too much in metaphor, and with illustrations on serious subjects somewhat too flippant—witness especially sections XII and XV—I feel constrained as a would-be "reorganizer"—in a modest kind of way—to lift up my feeble voice in protest against what is really the crux of the essayist's argument, though, perhaps, he himself would not so express it.

With the fundamental principle enunciated at the beginning of the essay, "*The industrial and commercial part of the naval establishment is the auxiliary of nothing; it is a main part,*" I am entirely in accord, as with the general argument for making haste slowly in changing a general organization that has stood more or less well the test of time—but *without ever having had the strain put upon it* that a war with a modern naval power would bring. Neither do I, nor, I think, other serious would-be reformers, believe in revolution; nor do we shout with the "mob." We are generally more or less silent, sensible people, who make very little noise in the world, who have spent a greater or less number of years in the diligent study of naval warfare and its history, endeavoring by study and sober forethought to prepare for the emergencies we may have to meet on the field of battle, when the honor, or may be the life, of the country will be in our hands, not to mention such small matters as our own personal lives and honors and those of the sea-army under us. Reorganizers of this

class wish neither to "revolutionize" the establishment—which would be an impracticable, visionary dream with our form of government—nor to "own" it or our brothers of the "industrial and commercial part of the naval establishment." We have studied war and history, which is our business, in an honest and earnest endeavor to learn from the campaigns and battles of the past what it was that lead to success, in order to be prepared, should our time come to lead the fleets of the country in war, to uphold its honor and glory. We have studied more or less earnestly the systems of other navies that have met with success in the shock of war, and those that have met with defeat, in order to extract from each its lesson.

In these studies we have learned—or believe we have learned—that, other things being even approximately equal, success invariably attends that side which is *best prepared;* and that preparation means not only the building and fitting of ships—that is the lesser element—but the organizing of the material at hand, both ships and men, *into a fighting force with definite plans and aims.* This latter is the greater element, and has been the key to success from Salamis to Tsushima; and in the organization of our naval establishment the means for accomplishing it had formerly no place, and only in very recent years has it appeared in an embryonic and scarcely recognized state, to meet with the almost united resistance of both Congress and our brothers of the staff, joined by many of the line itself, whenever it shows its infant head.

It is here that I and other would-be reformers of the same class take issue with the brilliant essayist. We do not believe that because, "The navy is over a hundred years old," we need not adopt the "big things" which have demonstrated their success in the conduct of naval campaigns and the shock of battles such as our navy has never known. We believe in adopting, or "copying," anything big or little that leads to success or the glory of the country. We have never conducted a naval campaign in the true sense of the word, for we have never had fleet opposed to fleet. We executed some brilliant ship combats in the wars of the Revolution and 1812—many pirates have done the same—we blockaded the southern coast and bombarded forts in the war of the Rebellion—the Confederates had no navy—and we demolished the so-called navy of poor, old, decrepit Spain in 1898.

In each of these latter wars few honest students of history can find anything creditable in their plan and conduct *during their earlier days*, and their success may be credited far more to the weakness of the adversary than to brilliancy on our part. Can it seriously be argued that these almost unopposed successes demonstrate the perfection of the system under which they were fought? And because we were successful then everything is perfect in our organization now?

Let us use our imagination for a moment, and transpose 1861 and 1898 to 1909, and in place of the navyless Confederacy let us place, say, Germany with its modern, well-equipped navy about equal to our own, and with their splendidly organized and informed general staff with plans complete and well matured aforehand; or, in place of decrepit Spain, let us place, say, Japan with a somewhat smaller, but perfectly organized and war-seasoned navy, and with a general staff, not exceeded in excellence and perfection by that even of Germany—who have had sense and foresight to "copy" from all services all things big and little that were good and could be applied to their uses. Would the results be the same? Prophesying is an unprofitable business, and the answer may be left to the imagination invoked. I may be allowed to state my own personal convictions, however, in the cases supposed: these are that, under present conditions, in the beginnings of such wars we would meet with defeat and humiliation, and it would only be by the expenditure of untold treasure and human life that we would attain ultimate victory.

Therefore, my brethren of the other side, do not let us sneer at things that are new, for the world is progressing always. Because a system was good a hundred years ago with the weapons and methods of that age, is hardly an argument for its use at the present day; for fighting machines, both material and human, unlike old wine, do not improve with age. If we wish to keep to the forefront—and to insure our future peace, and freedom from calamity if that fails, we *must* keep there in matters naval—we should invent, take, "copy" or in any other way appropriate to our own use any system, plan or invention that leads to the "best" use of the navy as a fighting force.

We would-be reorganizers of a certain school have very modest and reasonable designs against departmental organization as a whole, and *none* against that large and important branch of

it which the essayist calls the "industrial and commercial part of the naval establishment." We recognize "*their place*," in their place, as one of primary importance, and as a "main part." We are seeking neither to belittle them nor humiliate them, and have not the remotest dream of a desire to treat them "as dross," or "ride rough shod over human beings," and we recognize them as being "American citizens of the finest caliber," and as coequal brother officers. Neither have we any desire "to 'own' the whole of the naval establishment," nor to build a Chinese wall about the person of the Secretary of the Navy wherein he may loll away his official existence.

Our one small and modest desire is to advance the efficiency of the navy, and make of it the perfect fighting machine the country's expenditures call for, ready and prepared at all times to meet any emergency, and in this work we invite the co-operation of all officers of the service, irrespective of corps and rank.

We of the line at sea are the people who use the tools prepared by the "industrial and commercial part of the naval establishment," and are the people to whom the country gives praise or blame for success or failure, and who sink or swim in battle as our tools are bad or good and ill or well handled. To us is supposed to be given the actual conduct of war, and its study is our peculiar province. In this study, we have seen the English floundering around to success for several centuries in warfare on the sea in a groping kind of way that they seem to have hardly understood themselves; but which when sifted down to facts is seen to have been the result of selecting brilliant men with proper assistants from the best their service afforded, who organized and planned campaigns, and directed the naval policy of the country. This group they called the "Admiralty," and was the first inchoate example of what in later times is called a general staff, to which the Admiralty has more and more approached as its meaning has become better and better understood by themselves.

We have seen the French during the same period, following a line—not dissimilar to our own during the past century, and up to the present time—of lack of system and continuity, without preconceived plan or definite aim, acting at the moment as individual or expediency dictated, and—often even with superior force on their side—almost universally defeated. We have seen even as late as 1871, when, without aim or proper direction, their

vastly superior navy was a practical nullity in the war, and saw their country's defeat and humiliation without being capable of making a return blow. Handicapped as they are by their peculiar temperament and form of government, the French, themselves, have seen the errors of their ways, and during these later years have fallen into line with the other progressive nations, and are taking of their best to form a directive staff.

We have seen the German with his methodical mind, learning in humiliation the lessons of defeat, and slowly and methodically building up through the agency of their brightest military minds, under the direction of the great creative mind of Von Moltke, the originator of modern general staffs, that most perfect military engine the world had yet seen, the German Army, which first overthrew the Austrians in the six-weeks campaign of '66, and later the French in '71. We have seen the same method applied by the same people to the creating, building, equipping and organizing of a navy, and we have seen this navy come into being from nothing in a few years, till it is now one of the recognized world forces.

We have seen the Japanese, adopting the same methods, and borrowing the best there was for their own use from English, German or American, through the agency of a staff founded generally on the German system, with their brightest minds planning and directing at home, and collecting and adopting abroad, form within ten years the engine of war that overthrew the mighty power of Russia in the East. This last we have found especially instructive, for no war was ever carried on before of such magnitude both on land and sea, and so successfully, with such disproportionate means. And the meaning of it all was complete, thorough and perfect preparation and planning beforehand, carried on by, perhaps, the most perfect military and naval staffs the world has ever seen. I do not detract from the renown and credit of Togo and the admirals and Oyama and the marshals and generals who carried the plans into execution, by stating that, *that* is what they did—*they carried the plans of the staffs* they had themselves helped form into execution, step by step, as planned, as Von Moltke did in 1871.

These, my brothers, are some of the lessons we would-be reformers have learned of the progress of the world in the art of war. We see that should war come we will be pitted *not* against

a navyless Confederacy, or a decrepit Spain, but against the powers of the world who *think* and *plan;* who make the best use of the best intelligences the good Lord sends their services, by planning for all eventualities, acting sometimes on a general staff advising as to policies, looking into the future and maturing plans for war, advising as to faults that use discovers in the tools provided by "the industrial and commercial part," and charged with the general preparedness for war and the direction of the fleet in being and all that pertains thereto; and then, that touch may not be lost with the active service, or familiarity with the use of the tools of war, they return to their respective services on land or sea.

To meet this thorough organization, definite policy, and ceaseless planning of our possible enemies in war, what have we in our naval organization? We have a general board of insufficient membership and precarious tenure, a war college without practical staff, an insufficient office of naval intelligence supported by four attachés scattered over the face of the earth, and the overworked chief of bureau of navigation. Do you think, my brothers, such archaic means are sufficient to meet the thorough organization of our prospective adversaries? I do not. And yet whenever there is a whisper of a general staff, so loudly called for by the teachings of the times, to advise the Secretary in matters of military need, naval policy, correction of proven faults in material, and bear with him the responsibility of having the "fleet in being" prepared and planned for war at all times—which is now everybody's business, and therefore nobody's—we hear the wail of Chinese walls, desires to own the earth, the trampling of rights, and what not!

Believe me, some of us would-be reformers are looking for nothing personal, and expect nothing from the reforms we advocate but the general good that would accrue to the service and the country. We see—or think we see—a grave danger to the country should a serious war occur under existing conditions; and we see—or think we see—the remedy from our study of war and history. This remedy we believe to be the institution of a proper general staff in the personnel branch of the departmental organization, a remedy that has so signally proved itself in every leading military and naval organization of modern times. We are not looking to smite the other branches of the service, which

are in fact just as important and necessary in their way. So why should our friends of the staff cry out in alarm when they are not hurt, and raise the flag of opposition when any mention even is made of any proposal to increase the military efficiency of the fleet? In fact, any properly organized general staff should have on it representations from all the corps who have to do with the building and maintenance of the fleet, surgeons, paymasters, constructors and marines. So why the eternal wail? Is it that the general non-military duties of the offices performed overcome the military associations of the professions of the officers of all corps in the navy to such an extent that it blinds them to vital military necessities? Let us hope not, and forget for a while that we belong to this corps or that; but are *all* officers of the navy, necessary in our several capacities. You, the essayist, forget for a while that you may be Pay Director Smith, let him forget for a while that he may be Naval Constructor Jones, and I will forget for a while that I am Commander Robinson; and then let us be plain Smith, Jones and Robinson, three *officers of the navy,* who owe to it and the country our best efforts; and then get down to brass tacks and work together for the "best" good of the *whole* service, whether we think our slice of reward from the national pie counter is of the largest or not. Personally, I have never sought for pie, nor looked for a surfeit of that delicacy as a reward for advocating measures—and have not been disappointed.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

PROTECTING AMERICAN INTERESTS.

By COMMANDER GEO. R. CLARK, U. S. Navy.

"The U. S. S. ———— has been ordered to ———— to show the flag and protect American interests."—*News item.*

In preparing for the manifold duties they are called upon to perform, naval officers should not overlook the means of fitting themselves for the work vaguely called "protecting American interests." The difficulty attending this duty lies partly in its vagueness and partly in the lack of instructions. "The conditions," says the blue book, "calling for . . . . cannot be defined beforehand, but must be left to the sound judgment of responsible officers, who are to perform their duties in this respect with all possible care." Armed with general orders of this kind, with nothing even between the lines to guide him, the officer in the far-away port approaches his task, while at home the "man in the street" looks on with interest, ready to applaud success or condemn defeat.

On the shelves of some of the least used corridors in the libraries at Annapolis and Washington are many undisturbed volumes whose titles when freed from dust stand out as Senate Documents, Congressional Pamphlets, Diplomatic Correspondence, and the like, in which the seeker after light, if he succeed in passing the "best sellers" in the pleasant reading-room, will find much that will interest as well as a little that may confuse him. In one of these curious volumes of forgotten lore may be found some very instructive correspondence telling the story of one José Dolores Gomez, a gentleman of Nicaragua. The writers were leaders in their time, and their words, we may be sure, catch and hold the attention. Let us begin with a letter from Mr. T. F. Bayard, Secretary of State of the United States, to Mr. ———— Hall, United States minister to Central America, dated March 12, 1885:

"It appears that Mr. Gomez, who is said to be a political fugitive from Nicaragua, voluntarily took passage at San José de Guatemala for Punta Arenas, Costa Rica, on board the Pacific Mail steamship *Honduras*, with the knowledge that the vessel would enter *en route* the port of San Juan del Sur, Nicaragua.

"The government of Nicaragua, upon learning of this fact, ordered the commandant of the port of San Juan del Sur to arrest Gomez upon the arrival of the *Honduras* at that port. At the same time the government requested the U. S. consul at Managua to recommend to the captain of the *Honduras* to make no resistance. This the consul declined to do, having received from Mr. Hall, the American minister, instructions to say to the Nicaraguan minister of foreign affairs 'that our government never has consented and never will consent to the arrest and removal, from an American vessel in a foreign port, of any passenger in transit, much less if offense is political.' . . . .

"It is clear that Mr. Gomez voluntarily entered the jurisdiction of a country whose laws he had violated. Under the circumstances it was plainly the duty of the captain of the *Honduras* to deliver him (Gomez) up to the local authorities upon their request.

"It may be safely affirmed that when a merchant vessel of one country visits the ports of another for purposes of trade, it owes temporary allegiance and is amenable to the jurisdiction of that country, and is subject to the laws which govern the port it visits so long as it remains, unless it is otherwise provided by treaty. Any exemption or immunity from local jurisdiction must be derived from the consent of that country. No such exemption is made in the treaty of commerce and navigation concluded between this country and Nicaragua on June 21, 1867."

Before proceeding to the next case it may be well to quote from a letter from Mr. Hall to Secretary Frelinghuysen, Mr. Bayard's predecessor, under date of February 10, 1885, in which, despite his firm stand in his message to the consul, Mr. Leavitt, he seemed somewhat uncertain of his position:

"It seems desirable," said Mr. Hall, "that there should be more definite instructions for such cases; under certain circumstances there can be no doubt as to the right to arrest a person, who, like Gomez, voluntarily enters the jurisdiction of a State whose laws he has violated, even should he be in transit for another State and on board of a foreign vessel."

The following letter written by the consul to the minister, February 3, 1885, shows how the captain of the *Honduras* fared: "I have learned that the government requested the captain of the *Honduras* to deliver up Gomez, but he declined. He was then requested by the government to go ashore. This he declined to do. He then was requested not to sail for twenty-four hours. This also he declined, and the government alleges that he sailed in two hours without a license from the commandant of the port. For these alleged offenses, he, the captain, has been tried by the Nicaraguan government and found guilty, but I have not learned what sentence has been given."

The clear decision given by Mr. Bayard in this case seems, at first glance, to be the long-looked-for guide that is to make all plain sailing in the future, but wait. There is another book on the shelf, a twin book with a twin story that is treated, however, somewhat differently. The story, which concerns General J. Martine Barrundia, of Guatemala, is begun with an extract from President Harrison's second annual message, December 1, 1890. ". . . . The killing of General Barrundia on board the Pacific mail steamer *Acapulco,* while anchored in transit in the port of San José de Guatemala, August 28, 1889, demanded careful inquiry. Having failed in a revolutionary attempt to invade Guatemala from Mexican territory, General Barrundia took passage at Acapulco for Panama. The consent of the representatives of the United States was sought to effect his seizure. The captain of the steamer refused to give up his passenger without a written order from the United States minister. The latter furnished the desired letter, stipulating as the condition of his action that General Barrundia's life should be spared and that he should be tried only for offenses growing out of his insurrectionary movements. This letter was produced to the captain of the *Acapulco* by the military commander at San José as his warrant to take the passenger from the steamer. General Barrundia resisted capture and was killed. It being evident that the minister had exceeded the bounds of his authority in intervening, in compliance with the demands of Guatemala, to authorize and effect, in violation of precedent, the seizure on a vessel of the United States of a passenger in transit charged with political offenses, in order that he might be tried for such offenses under what was described as martial law, I was constrained to disavow the minister's act, and recall him from his post."

At 6.30 p. m., August 27, the American minister sent the following telegram: "General Barrundia is on the *Acapulco*. Guatemala alleges that he is hostile, and, being in their waters, can arrest him. I think that they have the right." On the next day, the 28th, the local authorities went on board and presented the communication from the minister. General Barrundia resisted arrest and was killed.

Secretary Blaine wrote a letter to the American minister, November 12, 1889, from which the following extracts are made:

". . . . A still later case is that of Gomez, in Nicaragua, to which you advert as more than justifying your course in respect to General Barrundia. I have carefully examined that case, and am compelled to entertain a very different opinion. Mr. Bayard, then Secretary of State, in his instruction to the American minister, March 12, 1885, said: 'Under the circumstances, it was plainly the duty of the captain of the *Honduras* to deliver him (Gomez) up to the local authorities upon their request.' By this, I take it, Mr. Bayard expressed the opinion that the captain, being within the local jurisdiction of a foreign State, might not resist the orderly application of its law to a passenger on board his ship. There is no suggestion that it was the duty of the United States minister to intervene or express consent to effect the arrest, either with or without conditions as to the nature of the proceedings against the accused or the penalty to be inflicted. I have yet to find in the records of this department the faintest trace of any instruction to that end."

In the above it appears that Mr. Blaine's objection was made not to the principle as laid down by Mr. Bayard but to the minister's interference in the matter.

"But," continues the letter, "between the general doctrine as broadly laid down by my predecessor in office and your action in respect to General Barrundia's seizure there is an impassable space." Does this mean that the general doctrine was all right and the conduct of the minister all wrong? Again, "I am aware that it may be said that after all you merely advised the captain of his duty. But the captain did not simply ask *advice*. There is not the slightest suggestion that Captain Pitts proposed to act otherwise than by your orders and under your responsibility. It was under these circumstances that you wrote the letter which became in the hands of a Guatemalan official the pretext of the

attempted seizure of General Barrundia. . . . . 'To surrender political offenders,' said Mr. Marcy, 'is not a duty, but, on the contrary, compliance with such a demand would be considered a dishonorable subserviency to a foreign power and an act meriting the reprobation of mankind.' It is believed that these declarations express the sentiment of the civilized world, and it is certain that any departure from them would be execrated by the people of the United States. . . . . For your course, therefore, in intervening to permit the authorities of Guatemala to accomplish their desire to capture General Barrundia, I can discover no justification."

The Secretary of the Navy wrote to the naval authorities as follows: " . . . . Whenever any passenger, whether American or foreigner, is received on board an American vessel, he comes under the American flag, and is entitled to the protection and security of which that flag is the guaranty. At sea this inviolability has in time of peace no exemption or qualification. *In foreign ports it is qualified only by the legal exercise of the territorial authority.*" Aye, that is just the point. The part in italics (which are mine) contains the gist of the whole matter, but no further light is spread there where, it seems to me, it is needed. The Secretary continues: " Under these circumstances, on the approach of the steamer, before she cast anchor in the port, it was the plain duty to proceed at once to meet the steamer to warn the captain of the danger and to offer to his passenger, should he desire it, an asylum on board ship. Such an act could have violated no rights of the territorial government."

Let us consider this a moment. If the authorities were confident of their rights regarding the question of territorial jurisdiction, the right of interference to prevent seizure while in the port, as expressed in the views of Mr. Marcy and endorsed by Mr. Blaine, was there any need of putting to sea and evading the issue? Would not the act of meeting the steamer outside the port have been, in effect, an acknowledgment of the port's exclusive jurisdiction in the matter?

Again, " Even after the arrival of the *Acapulco* in port, the power of discretionary action was by no means taken away. There were, in particular, three points in which the existing situation imposed a positive duty, namely:

" 1. To make a full investigation of the facts.

"2. To prevent with such assistance as might be found necessary any proceedings on board the steamer calculated to endanger the safety of those on board.

"3. If, upon examination, it appeared that a seizure was to be attempted *without proper warrant*, or that the proceedings were merely in the nature of a pretext to secure the person of the political fugitive, to offer him, in accordance with humane and well established practice in the case of refugees whose lives are in danger, the hospitality of your own vessel."

A study of the points, imposing, according to the Secretary, positive duties, shows that a strict carrying out of the provisions of the second would have amounted to a direct interference and prevention of the seizure (for surely the safety of the fugitive was in danger), a proceeding which the guarded language does not, in so many words, direct. In the third point a certain line of action is suggested in case a seizure is attempted *without proper warrant*, leaving it to be inferred that in the other event, that of the presentation of a proper warrant, some other course, not mentioned, would be in order. Here again the winds are variable in force and direction, as a reference to the U. S. Naval Regulations, p. 87, art. 344, will show: "The right of asylum for political or other refugees has no foundation in international law. In countries, however, where frequent insurrections occur, and constant instability of government exists, usage sanctions the granting of asylum; but even in the waters of such countries, officers should refuse all applications for asylum except when required by the interests of humanity in extreme or exceptional cases, such as the pursuit of a refugee by a mob. *Officers must not directly or indirectly invite refugees to accept asylum.*" Again, on the same page, in article 340 (1), we find more food for thought, something else to give us pause: "He (the commander-in-chief) shall exercise great care that all under his command scrupulously respect the territorial authority [the authority conceded by Secretary Bayard] of foreign civilized nations in amity with the United States."

A reading of Mr. Blaine's letter to the American minister does not make it quite clear whether the exact mistake of the latter was in interfering to aid the seizure, or in interfering in any manner whatever. In the latter case it would seem hardly fair to the captain of the *Acapulco* to let his appeals for instructions

go unheeded while there was a representative of his country in Guatemala City charged with the protection of American interests. Old-fashioned people might think that the whole burden of decision should not be left, in such cases, to the captain of the merchant steamer, but that it should be shared, at least, with a civilian official familiar with the law.

So here we are on poor holding ground again. When the trained diplomats find themselves at fault in the execution of their difficult tasks, and cry for "more definite instructions," it is small wonder that the laymen, the blunt sailors, sometimes feel a bit wabbly in the legs when taking a walk on shore in the strange fields of diplomacy.

A third book relates still another story, which, while having no connection with those already told, may still serve to show the infinite variety of cases and treatments filed away on these shelves. President Cleveland's second annual message, December 3, 1894, contains the following: " . . . . It appearing at an early stage of the Brazilian insurrection that its course would call for unusual watchfulness on the part of this government, our naval force in the harbor of Rio de Janeiro was strengthened. Our firm attitude of neutrality was maintained to the end. The insurgents received *no encouragement of eventual asylum from our commanders,* and such opposition as they encountered was for the protection of our commerce, and was clearly justified by the public law."

" . . . . For some months one, and during part of the time two, of our naval ships have been stationed at Bluefields for the protection of *all legitimate interests* of our citizens. In September last the government at Managua expelled from its territory twelve or more foreigners, including two Americans, for alleged participation in the seditious or revolutionary movements against the Republic of Bluefields. . . . . Our naval commanders at the scene of these disturbances by their constant exhibition of firmness and good judgment contributed largely to the prevention of more serious consequences and to the restoration of quiet and order."

The above may seem all easy enough, but the whole matter of the last paragraph lies, I think, in the italicized word *legitimate*. The solution of all puzzles is easy when we know the key, which consists, sometimes, of one word.

" . . . . The government of Salvador having been overthrown by an abrupt popular outbreak, certain of its military and civil officers, while hotly pursued by infuriated insurgents, sought refuge on board the United States war ship *Bennington*, then lying in a Salvadorean port. *Although the practice of asylum is not favored by this government,* yet in view of the imminent peril which threatened the fugitives and solely from considerations of humanity they were afforded shelter by our naval commander, and afterwards under our treaty of extradition with Salvador for trial on charges of murder, arson, and robbery I directed that such of them as had not voluntarily left the ship be conveyed to one of our nearest ports where a hearing could be had before a judicial officer, in compliance with the terms of the treaty. On their arrival at San Francisco such a proceeding was promptly instituted before the United States district judge, who held that the acts constituting the alleged offenses were political, and discharged all the accused except one Cienfuegos, who was held for an attempt at murder. Thereupon I was constrained to direct his release for the reason that an attempt to murder was not one of the crimes charged against him, and upon which his surrender to the Salvadorean authorities had been demanded."

One of the results of the Salvadorean affair was the substitution by the Secretary of the Navy, August 15, 1894, of article 288, U. S. Navy Regulations, 1896 (now article 344, 1909) for article 287 of 1893.

In the search for precedents it is well to be cautious, for customs sanctioned in the early days may now be forbidden by regulations. One of the many points to be considered is that concerning the relations between envoys and naval officers. A former naval secretary has said (1889): "In the performance of his duties under the law the responsibility of a naval officer is complete, nor can anything but the orders of his superior shift the burden to another. This familiar principle governing the relations of envoys and naval commanders is well understood."

This principle is now supported in the blue book in article 337, which reads, "Although due weight should be given to the opinions and advice of such representatives [diplomatic representatives of U. S.], a commanding officer is solely and entirely responsible to his own immediate superior for all official acts in the administration of his command." While that principle may

have been well understood in 1889, the contrary principle was in force shortly after the close of the Civil War, as is shown by the following letter written August 27, 1867, by the Hon. Peter J. Sullivan, American minister to Colombia, to Rear-Admiral Jas. S. Palmer, U. S. N., commanding the North Atlantic Squadron:

"Sir: . . . . Until further instructions you will repair forthwith to, and keep strict surveillance over, the steamer *Rayo*, her armament and other property, so far as to prevent her from being used for piratical or other unlawful purpose, detrimental to the rights and dignity of our government. *You will report to me from time to time your action and the course of events in this case.*" Mr. Sullivan's letter concludes: ". . . . From the general report which I have had of your sound discretion and great ability as a naval commander, I trust you."

Rear-Admiral Palmer, struggling, no doubt, with the difficulties and annoyances inseparable from the lot of one compelled to serve two masters, must have found consolation in that part of the minister's letter that gave assurances of trust in the naval officer.

A correspondent, Mr. Carrasco, having inquired whether, if he should take passage at New York for Mexico in an American passenger boat, which stopped for a few hours at Havana, he would receive energetic protection from the Department of State in case his arrest should be attempted by the authorities of that city during the stay of the vessel in port, Mr. Bayard, July 16, 1886, replied:

"While I am far from saying that an arrest by Cuban authorities of an American citizen, in an American passenger vessel, transiently in a Cuban port, the charge being a political offense, would be looked upon with indifference by this Department, yet I would advise you not to put yourself in a situation where you would be exposed to such arrest."

Thus we hear the cry on all sides for directions, for instructions. At the risk of being tedious I shall quote at length a letter from Secretary of State Gresham, written December 30, 1893, to Mr. Huntington, an official of the Pacific Mail Steamship Company, because I think it approaches more nearly than anything else I can find an answer to the appeal that comes from official and civilian alike. Don't skip it, gentle reader, it is worth while.

". . . . You suggest in your letter of November 11, 1893, that a definite policy in respect to surrendering accused crimi-

nals when claimed by the local authorities in a port of call be outlined for the guidance of your commanders.

"It is not practicable to lay down a fixed rule applicable to the varying conditions in such cases. As a comprehensive principle, however, it is well established in international law that a merchant vessel in a foreign port is within the local jurisdiction of the country with respect to offenses or offenders against the laws thereof, and that an orderly demand for surrender of a person accused of crime by due process of law, with exhibition of a warrant of arrest in the hands of the regularly accredited officers of the law, may not be disregarded nor resisted by the master of the ship. On the same voyage when the Amapala incident occurred, Captain Dow appears to have acted on this principle in allowing the arrest at other ports, on proper judicial warrant, of two passengers accused of crime. That the passenger may have come on board at the port where the demand is made, or at another port of the same country, is immaterial to the right of local jurisdiction.

"Arbitrary attempts to capture a passenger by force, without regular judicial process, in a port of call, may call for disavowal when, as in the present case at Amapala, the resort to violence endangers the lives of innocent men and the property of a friendly nation. Whether, if force be threatened, the master of the vessel is justified in putting in jeopardy, by his resistance, the interests committed to his care, must be largely a question for his discretion. It is readily conceivable that the consequences of futile resistance to overpowering force may be such as to make the resistance itself unwarrantable.

"*The so-called doctrine of asylum having no recognized application to merchant vessels in port,* it follows that a shipmaster can found no exercise of his discretion on the character of the offense charged. He is not competent to determine whether the offense is one justifying surrender, or whether the evidence in the case is sufficient to warrant arrest and commitment for trial, or to impose conditions upon the arrest. The diplomatic and consular representatives of the United States in the country making the demand are as incompetent to order surrender by way of quasi-extradition as the shipmaster is to actively deliver the accused.

"If it were generally understood that the masters of American

merchantmen are to permit the orderly operation of the law in ports of call, as regards persons on board accused of crime committed in the country to which the port pertains, it is probable on the one hand that occasions of arrest would be less often invited by the act of the accused in taking passage with a view to securing supposed asylum, and on the other hand, that the regular resort to justice would replace the reckless and offensive resort to arbitrary force against an unarmed ship which, when threatened or committed, has in more than one instance constrained urgent remonstrance on the part of this government."

That this letter of Secretary Gresham's is an important State paper is shown by the fact that on March 22, 1898, Mr. Sherman, then Secretary of State, instructed Mr. Merry, American minister to Nicaragua, that he was to be guided by it.

So there the matter of territorial jurisdiction, the right to prevent seizures, rests. "Rests" is the proper word, for the question is not dead but sleeping. A pistol fired in the street of a Central American village may waken it, and to-day, any commanding officer, ambitious to acquire fame on the uncharted seas of American interests, will, in spite of cables and wireless plants, be as free to act, as untrammeled by instructions, as were his predecessors of twenty and thirty years ago.

I think the foregoing is enough to show the perplexing nature of the situations with which naval officers are often confronted, situations that make large drafts upon that inexhaustible stock of discretion and sound judgment with which both the State and Navy Departments seem so ready to credit them, and upon which they so often rely.

This paper is not written in a spirit of criticism, but is a groping for the switch that turns on the light, and an attempt to indicate the necessity of careful study in the field that has to do with the protection of American interests. In the absence of any instructions covering even in a general way the principles in question, I dare say it would not be far wrong, *when in doubt,* to fix upon, as a general guide, a line of action that ascribes to our flag even more power than it rates, and to leave the fine points of law to be settled by the seniors at Washington, who, we have a right to assume, have at hand the precedents and authorities and training to guide them to just decisions. Finally, if apologies *must* be made, it is easier and less humiliating to make them to a foreign flag than to our own.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE INVENTION AND DEVELOPMENT OF THE NAVAL TELESCOPE SIGHT.

By CAPTAIN BRADLEY A. FISKE, U. S. Navy.

"Who are those thin men, papa, with old clothes on?"

"Those are inventors, my child."

"And who are those fat men with nice clothes and big cigars? Are those inventors too, papa?"

"No, my child. Those are the men who improve on the inventors' inventions."

In Lord Brassey's Naval Annual for 1906 is an extremely able and interesting chapter, by Commander Charles N. Robinson, R. N., called "The Gunnery Practice of the Fleet."

The chapter is largely historical, and begins by reciting an Admiralty Circular, dated January 31, 1906, in which their Lordships express great satisfaction with the gunnery practice of 1905, and attribute the successful results mostly to "the great interest and keen spirit displayed by officers and men, the general introduction and use of additional instructional appliances, and the improved system of gunnery training now in operation."

Commander Robinson says of this memorandum, "It marks indeed the beginning of a new era in the conditions and aspects of naval gunnery." He also says of it, "The letter is at once an official pronouncement that, as battle efficiency is the first consideration, so accuracy of fire is the first essential to its attainment; that everything else is to be deemed of secondary importance in relation to proficiency in this respect; and that officers who look for future advancement will find no better stepping stone to the goal of their ambition than a zealous effort to achieve distinction in this direction."

I should like to quote the whole of this interesting chapter, be-

cause it is hard to show otherwise how perfectly its writer is convinced that the excellent gunnery of the present time is due wholly to a certain system of training faithfully carried out, for which the entire credit belongs to the British Navy, led by Rear-Admiral Sir Percy Scott. The only suspicion shown by the writer of the chapter that any other navy or any other person was concerned in it, is shown by the following sentence which speaks of a time, approximately 1902 or 1903. The sentence reads: "The Americans had already recognized the need for improvement, and an inspector of target practice, in the person of Lieutenant W. Sims, had been appointed to reorganize this department of gunnery with marked results."

The chapter describes the condition of naval gunnery as having been bad for very many years, and then says, "Things went on pretty much as here described until 1898, when two things happened to draw the attention of the naval world to the subject of marksmanship with big guns. One was the battle of Santiago, when of Cervera's squadron of cruisers, it was said that their fire was at first terrific, but the harm done was next to nothing, owing to the unskillful handling of the Spanish guns; nor did the proportion of hits to shots fired redound to the credit of the American gunners. The second concerned the record firing of the *Scylla*, a small vessel of the Mediterranean Station. The captain of the *Scylla* (now Rear-Admiral Sir Percy Scott) had struck out a line of his own. He had provided his own telescopic sights and instructed his men with a loading teacher and a dotter, both of his own invention; so that presently the ship made a score at prize firing such as the navy had never thought possible."

The present writer has no desire to rob the British Navy of any of the credit which it justly merits for the marked improvement in naval gunnery during the past few years; neither has he any desire to rob Sir Percy Scott of any credit that he has received; because he has received no more credit than he deserves. All the praise that Sir Percy Scott has received, and all the official commendations, promotions and decorations that he and the officers whom he inspired have received, both in the British Navy and in other navies, have been justly earned. But, nevertheless, the present writer believes that he can prove that the credit for the accurate naval gunnery of the present day does not primarily belong to the British Navy, but to the American Navy; and that the

naval gunnery of to-day did not have its birth on board of H. M. S. *Scylla*, on the Mediterranean Station, at some time after 1898; but on board the U. S. S. *Yorktown*, at Unalaska, on September 12, 1892.

The facts are as follows: (I hope I shall be forgiven for telling the story in the first person; but after several attempts, I have found it utterly impossible to do otherwise, without making the story sound artificial and mock modest.)

In the spring of 1890, I went out to sea on board the U. S. S. *Baltimore* with the Board of Inspection, to be present when the battery and the electrical range finder were tested. Firing had finished with the port battery, and begun with the starboard, when a large flock of schooners got in the way, and practice had to be stopped for a while. I amused myself by looking at the schooners through the telescope of the forward instrument, and noticing how definitely the cross hairs of the telescope moved across their sails, with the gentle rolling and pitching of the *Baltimore*. I had watched this in an idle way for a few minutes, when the thought came that anybody could fire all the guns in the broadside from that place, and hit the target every time, by setting the telescope at the angle of depression equal to the proper angle of elevation of the guns, leaving the guns parallel with the deck, and firing when the roll of the ship brought the cross hairs on the target.

In a few minutes, however, cold, pitiless reason pointed out the practical impossibility of mounting the guns so that the angle of elevation of all would be the same.

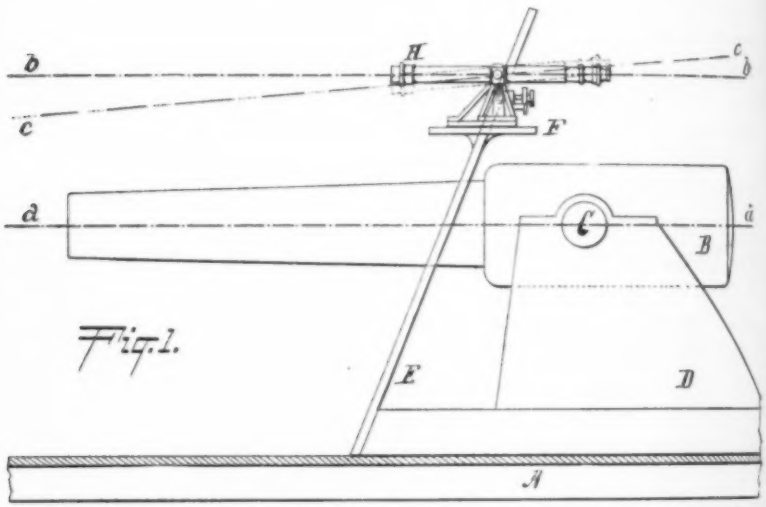
Nevertheless, I decided to patent the scheme, reasoning that ships would be constructed, as the years went by, of increasing size and with increasing perfection of workmanship. On May 15, 1890, I applied for a patent on "A Method of Pointing Guns at Sea." The Patent Office made numerous objections, but finally granted a patent on September 9, 1890.

In 1891, I found that the British had tried a plan substantially the same; in fact that they had mounted in the conning-towers of one or more of their ships telescopes called "gun directors."

I did not think the scheme would become practicable for some years to come. My main idea in taking out the patent was to combine it with some other patents that I already had on "range and position finders." By the method and apparatus described in those patents, the distance and direction of a distant object could

be ascertained, and all the guns of a fort, by electrical arrangements on their elevating gear and training gear, could be concentrated on it from central protected stations; and I thought that it might become possible, in the future, to put similar electrical gear on the guns of a ship, and by combining this system with a range finder having two armored observing stations, to direct and fire all the guns correctly from the conning-tower.

Meanwhile, I sketched many schemes on paper for mounting a telescope on a ship's gun, much as one is mounted on a musket, but arranged so that, when the gun recoiled, the sight itself would not come back with the gun and strike the gun captain in the eye, but



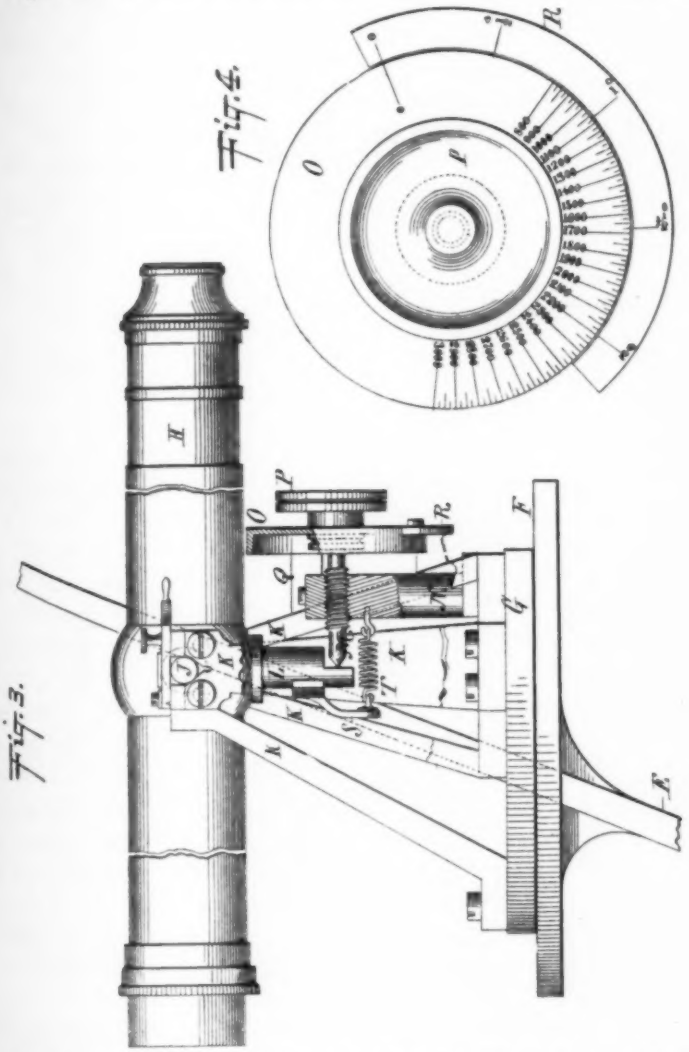
would stay away from it; that is, the gun would slide under the sight. The favorite plan was some electrical mechanism, which, when the gun captain pressed the firing button, would cause the telescope to slide forward. Some of the plans were not so very bad, but they all seemed too dangerous, because the mechanism might fail. In those days, it must be remembered, we did not have any guns that recoiled in the line of fire, except small guns.

One evening the idea came sharply:

"You needn't put the telescope on the gun; just put it on something that moves with the gun but doesn't recoil."

A simple mechanism for carrying the idea into effect was quickly devised; and on March 9, 1891, I applied for a patent on "A Telescopic Sight for Ships' Guns."

The Patent Office, after fighting a year and a half, finally yielded and granted a patent, which was issued on September 5, 1893. Figs. 3 and 4 show the construction. As our main battery guns



did not recoil in the line of fire, the sight was attached to the gun shield, as shown in Fig. 1; and the range indication was brought into alinement with one of the marks on the stationary rim, surrounding the range disc, which showed the initial angle of eleva-

tion of the gun. The idea explained in the specification of the patent was that the gun should be given some convenient initial angle of elevation, the range mark on the disc brought opposite the mark which indicated that angle, and the gun fired when the roll of the ship brought the sight on the target. This was the best that could be done with that kind of gun-mount.

After filing the application, I constructed an instrument substantially like that shown in Fig. 3. The base shown in the figure, however, was mounted upon another base, on a vertical pivot, and a tangent screw, operating against a spiral spring, was arranged to revolve the telescope and its supporting base through a small angle in azimuth, to make proper allowance for drift and speed; a pointer on the upper base being thus made to move over suitable graduations on the lower base.

The telescope was like those used on the *Vesuvius* range finder. *It was 2 feet long; the object glass was 2 inches in diameter; the field of view was* 8° ; *the magnification was* 4.

It was constructed by the late W. E. Stackpole, who had been making high grade telescopes for surveying and astronomical use nearly all his life. I have never seen a better telescope than the one he made for the first naval telescope sight in 1891. The field was flat, the definition excellent and the cross wires as fine as was compatible with strength and clear visibility. They were secured very firmly in the exact focal plane of the object glass, and there was no discoverable parallax. The wires formed a single cross.

That the telescope was rugged is proved by the fact that it remained in excellent condition, without any repairs whatever, for several years, two and a half of which were spent in the *Yorktown* and one and a half in the *San Francisco*. That it was pretty nearly what a telescope for a telescope sight ought to be, is shown by the strong resemblance between it and the telescopes issued in sights during the past two years.

Shortly after making this sight, I wrote to Commander Folger, Chief of Bureau of Ordnance, asking his permission to show it to him. He replied in the affirmative, specifying a certain hour in the afternoon a few days later. I sent him the sight and followed it the next day.

I appeared at the bureau at the designated time, and saw the instrument on his desk.

Our interview did not last half an hour. At first, Commander

Folger was opposed to my idea; but as soon as I had explained it fully, he reversed his attitude completely, and declared that I had made a very great invention. "You have changed naval gunnery from a game of chance into a science," he said.

When I was taking my leave, he said that he thought the best way in which to get an intelligent trial of the sight was to send it to the *Yorktown*, because Commander Chadwick was the captain.

I did not see the *Yorktown* for about a year, and then I went on board of her at the New York Navy Yard. I found that the sight had not been tried during the year, and that it was still in the box in which it had originally come. Commander Chadwick had been relieved by another commander.

A few days later I was ordered to the ship. The ship went to sea on October 10, 1891, bound for the Pacific.

Some time during the first quarter of 1892, we had target practice. I asked to have the telescope tried; and a few shots were fired by the gun captain, with the result indicated in the following report. I think he fired four shots, and they all went to about the same spot, about 400 yards short of the target. I tried to explain to the captain that this must have been due to my not getting the zero adjustment just right, and pointed out that this was extremely difficult to accomplish at sea, with a vessel that rolled as much as the *Yorktown*. I could not make him see the matter from my point of view, however, and so the following report was sent.

This may seem very curious to officers now who are familiar with what we call "bore-sighting"; but the fact is that all the officers of the *Yorktown* agreed with the captain. I heard him order one of the watch officers to look through the telescope sight and tell him what he thought of it. The officer replied, "I think it increases the difficulty of sighting, sir."

The report was as follows:

U. S. S. YORKTOWN, 3D RATE,
NAVY YARD, MARE ISLAND, March 31, 1892.

The Honorable Secretary of the Navy, Washington, D. C.

SIR.—I have the honor to report, that during the target practice, for this quarter, I tested the Fiske telescopic sight under the personal supervision of the inventor.

The sight was fitted to the forward 6-inch B. L. R. and the gun captains, who had been doing excellent shooting, with the ordinary sights, were required to use it. The shooting immediately became so bad that the use of the sight was discontinued, the inventor admitting that something was radically wrong with it.

Afterwards, I required the executive officer to observe the target through the Fiske sight, when the gun was fired with the ordinary sights. He reported that the target was not anywhere near the cross wires when the gun was fired, yet the shot was an excellent one. He was cut over the eye by the recoil of the sight. The shots fired with this sight are marked on the returns.

In its present shape it is of no value on board ship.

Very respectfully,
Your obedient servant,

_____,
Commander, Commanding.

Commandant's Office, Navy Yard, Mare Island, Cal., April 11, 1892.
Forwarded to Bureau of Ordnance. John Irwin, Commandant.

As the captain declined to let me have any more shots, I wrote an official letter to Commander Folger, who was still Chief of Bureau of Ordnance, describing the difficulty, as I understood it, and requesting that the commanding officer of the *Yorktown* be ordered to let me fire ten more shots. This request was granted.

On the afternoon of September 12, 1892, after the usual target practice, I obtained permission to fire five shots, using the telescope sight.

It had not been altered in any respect, whatever, since it had been tried in the preceding spring.

Eighteen shots had been fired in the morning of September 12, 1892, six from each gun on the starboard side. I fired five shots in the afternoon. The results are shown in the accompanying diagram. The shots fired with the open sight are numbered from 1 to 18, inclusive; the shots fired with the telescope sight are numbered from 19 to 23, inclusive. As each one of the squares represents only 2½ feet on a side, it will be noted that the worst shot (No. 23) was less than 10 feet from the center of the target.

It is not possible to make a mathematical comparison between the shooting done in the afternoon and the shooting done in the forenoon, because they do not belong to the same class; especially since the last shot, No. 23, was not fired at the target, because the target had been knocked down and was lying in a wreck on the raft; but was fired (very foolishly) just above the vague outline of the wreck.

When the target was brought back on board ship it had three holes through it, though only four shots had been fired at it. The target was of the regulation pattern of that day—practically a triangle about 12 feet high and 10 feet across the base.

Note
The dots and figures in red indicate the points of impact of projectiles fired, using the ordinary gun-sights = The dots and figures in black indicate the points of impact of projectiles fired using Telescopic gun-sight

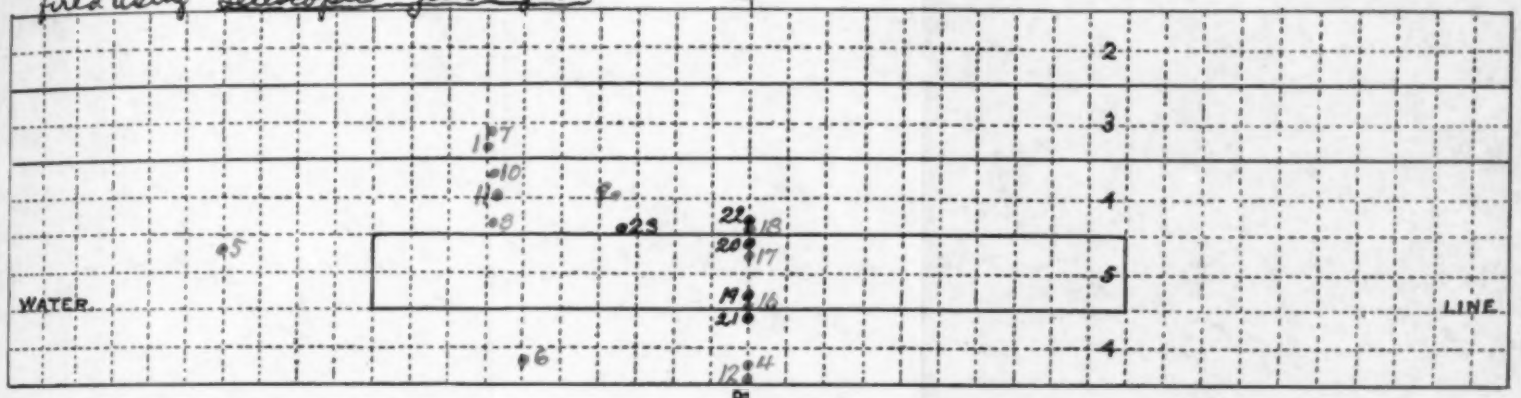
VERTICAL TARGET,

Scale, 1 Inch = 10 Feet.

ABOVE

showing points of impact of 6" projectiles fired, using ordinary gun sights and Telescopic gun sight

Shots 2, 3, 13, 14 and 15 cannot be plotted on this sheet.



Shots 1. 4. 5 and 6 are correctly plotted; shots 2 & 3 can not be plotted on this sheet.

T. E. De Witt Veeder Lieut. in charge 1st Division

Shots 7. 8. 9. 10. 11 and 12 are correctly plotted

B. A. Fiske, Lieut. in charge 2d Division

Shots 16. 17 and 18 are correctly plotted; shots 13. 14 & 15 can not be plotted on this sheet.

A. Winterhalter Lieut in charge 3d Division

Shots 19. 20. 21. 22 and 23, fired using Telescopic Gun-Sight are correctly plotted

B. G. Hutchison Ensign & observer

Shots Fired.	Guns, Number and Class.	Name of Gun Captain.	Average Time Between Shots.	Number of Guns Firing	Limits of Range.	Merit On Target.	Final Merit.
	6" B.L.R				Yards 1320		

At Anchor

U.S.S. Yorktown.

Date of Practice, September 12, 1892

Place of Practice: Unalaska, Alaska.

Wind and Weather: Light breeze. Clear.

Smoke: Not great at instants of fire.

Rolling and Pitching: 1° each side; pitching imperceptible.

The actual scale of this reproduction is 1 inch = 12 feet.

Surprise has been expressed that the accuracy was so great; but there is no reason whatever why the accuracy should not have been so great; and there are two conclusive reasons why it should have been:

(1) *The telescope sight in the Yorktown was as accurate and reliable as any that have been made since.*

(2) I was careful not to fire except when the cross wires rested on the center of the target.

A few days later, moving target practice was held. Nine shots were fired using the open sights, and the tenth shot was fired using the telescope sight. The results of the target practice are shown in the following diagram.

I then made the following report to the Bureau of Ordnance:

U. S. S. YORKTOWN,

UNALASKA, ALASKA, September 29, 1892.

Commander William M. Folger, U. S. Navy, Chief of Bureau of Ordnance.

SIR.—Referring to the allowance of ten rounds of 6" ammunition, kindly made me by the bureau, I beg to state that I have been able to fire six of these; five at stationary practice and one at moving practice. The telescope was mounted on the shield, and I used electric primers.

I send herewith diagrams showing the results.

At the stationary practice, shot No. 22 carried away the target, and shot No. 23 was fired at the wreck.

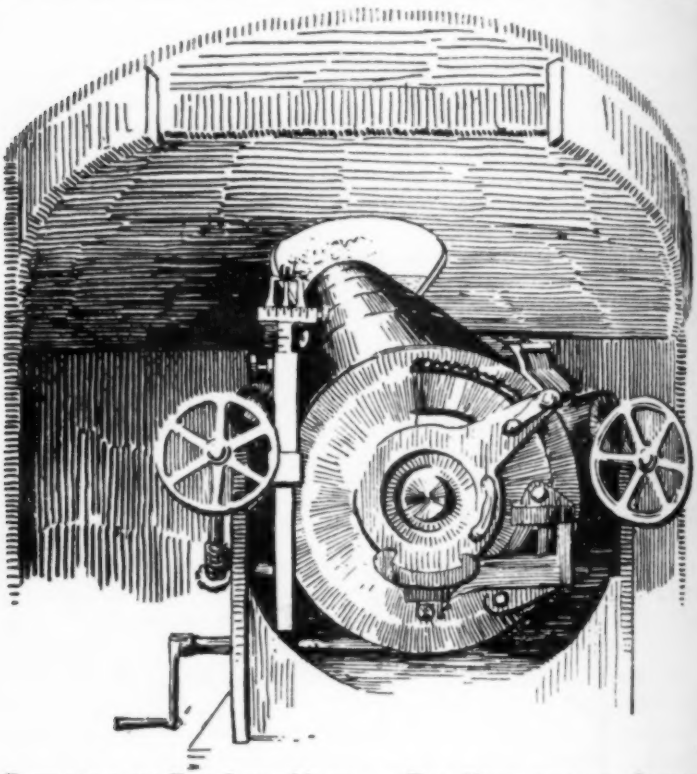
At the moving practice shot No. 7, fired using the ordinary gun sights, carried away the target, and shot No. 10, using the telescopic sight, was fired at the wreck. As nearly as could be determined, this shot would have struck the target, had the target been there, on the left side 2½ feet above the water-line. After firing this shot, I remarked to the commanding officer that the wreck was hard to see, and he discontinued the practice; the weather was now becoming bad.

I found no difficulty in directing the gun on the target at either stationary or moving practice, using the telescopic sight.

I found that any change in setting, necessitated by a change in range, can be more quickly and safely made than with the ordinary sights, where a man has to step up to the breech of the gun. At the recent practice, a man who had just adjusted one of the ordinary sights was hurt, because the gun was fired before he had gotten clear of the breech.

I found no inconvenience arising from the proximity of the eye to the eye piece of the telescope at the instant of discharge; but as a matter of precaution, I held the eye piece by the thumb and forefinger of my left hand and rested my eye against my thumb and forefinger, instead of directly against the eye piece. I found no inconvenience in thus holding the telescope.

Targets are frequently struck, when the ordinary sights are used; of course, this kind of shots could not be improved by using the telescopic sight or any other sight. It would seem, however, that this sight ought to stop wild shooting altogether, because the cross wires show the gun captain exactly how the gun points, and also magnify by 4 the distance by which the gun is off the target at any instant. This sight seems to eliminate those errors of naval gunnery that are due to inaccurate sighting; if a man can see through a telescope at all, the construction of the



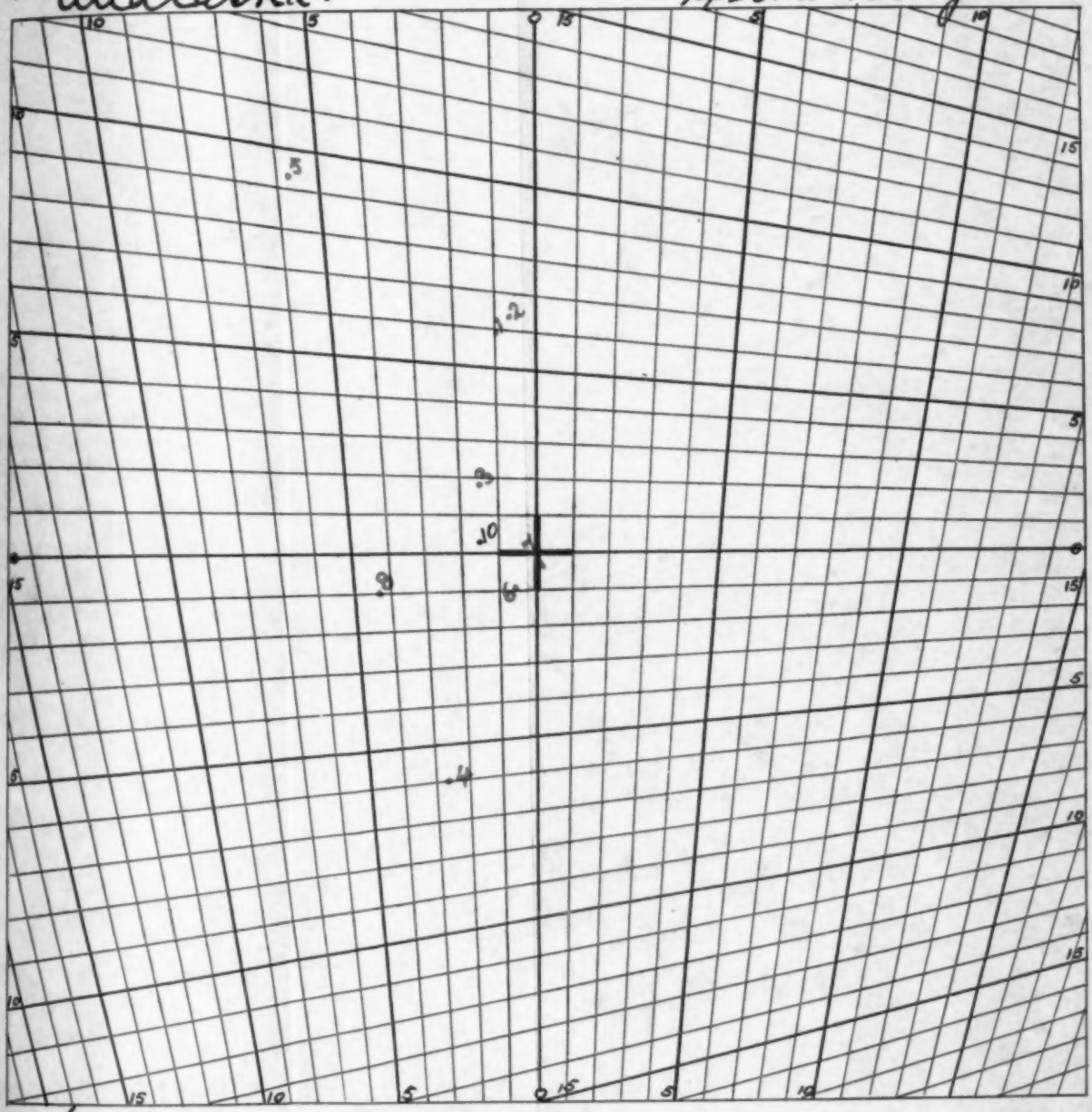
A BATTLESHIP 300 FEET LONG, MASTS 150 FEET HIGH, SEEN OVER ORDINARY GUN SIGHT AND THROUGH PORT IN GUN SHIELD.

Horizontal field in gun port = 9.5°. Vertical field = 3°. Eye of gun captain being 60 inches behind rear sight. Ship is 2000 yards distant.

telescope forces him to look along the axis of collimation, even if his eye is not accurately placed. That this is not the case with the ordinary sights, where a man can keep the pupil of his eye *exactly* on the line running between the front and rear sights, need not be pointed out.

Almost as important as the question of accurate sighting is the question of rapid and convenient sighting; and it is apparent that, if the field of

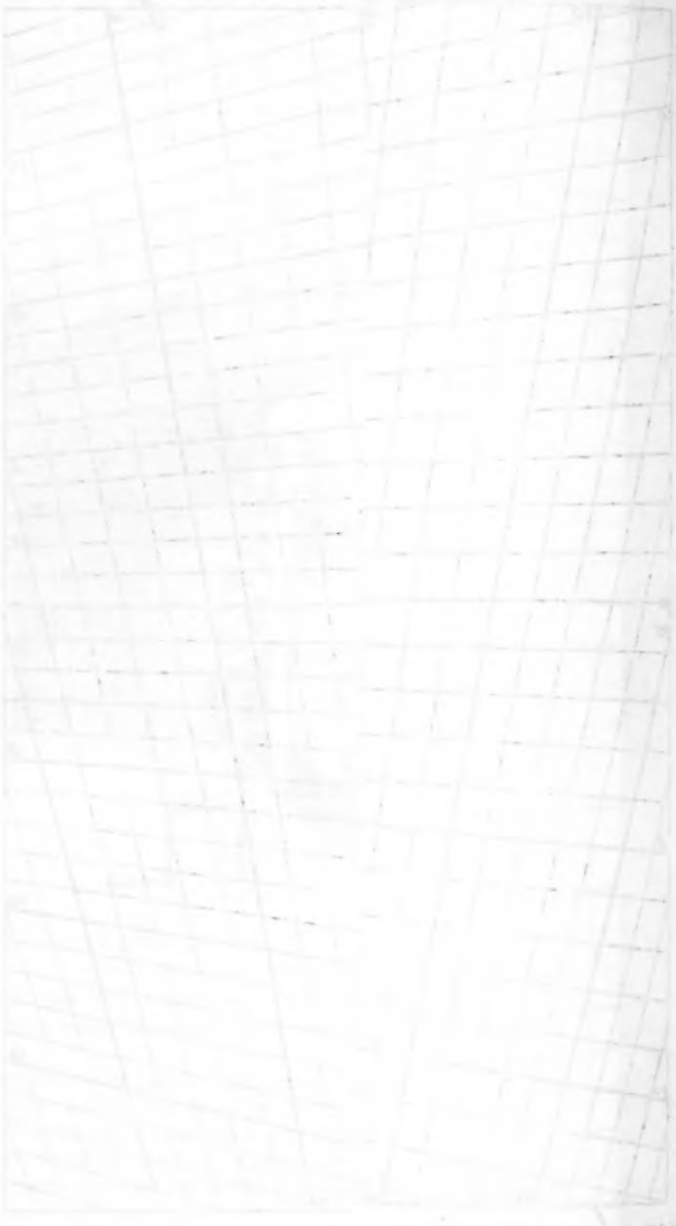
USS. Yorktown
September 12, 1892 HORIZONTAL TARGET. Mooring Practice
Unalaska. Scale 1 inch = 100 Yards. 1420 to 1000 yards.



10 was fired using Telescopic Sight

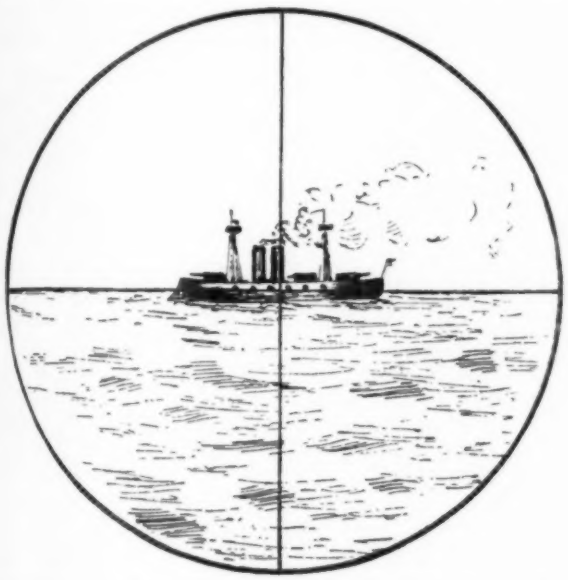
Radiating Lines are 1° apart.
Observers at 1.500 Yards from the Center of the Sheet.

The actual scale of this reproduction is 1 inch = 120 yards.



view of the telescopic sight were small, it would be worthless on a moving platform, because it would be nearly impossible to keep the target in the field of view, and therefore nearly impossible to direct the gun on the target.

It was found possible, however, by Stackpole, the instrument maker, to construct this telescope with a magnification of *4* (which is enough) and a field of 8°. This takes in 504 feet at 1200 yards, 840 feet at 2000 yards, 1008 feet at 2400 yards, etc. It will be seen that this field is ample, being in fact considerably larger than the field obtained using the ordinary sights, and looking through the ports in the gun shield. To a man standing 60 inches behind the rear sight, the total field is 9½° horizontally and 3°



SAME SHIP SEEN, AT SAME DISTANCE, THROUGH TELESCOPIC GUN SIGHT.

Horizontal field = 8°. Vertical field = 8°. Magnification, 4 diameters.

vertically. On page 8 are shown two diagrams, drawn to scale; one diagram shows how a ship looks when viewed over the ordinary sight, the other how she looks through the telescopic sight. In each case, the ship is supposed to be 2000 yards distant, to be 300 feet long and to have masts 150 feet high, above the water.

With the ordinary sights, accurate shooting on the down roll is difficult, unless the sea is smooth, because, owing to the small field below the line of sight, the target cannot be seen at all until it is almost "on"; and it comes "on" very suddenly. With the telescopic sight, the fact that there is a field of 4° below the cross wires, as well as above, makes it as easy and accurate to fire on the down roll as on the up roll.

By making one trunnion hollow, and placing a little lamp near it, to illuminate the cross wires, as is done with some surveying instruments, a night sight is obtained more simple than those now in use.

Should any accident befall the telescope, the ordinary sights can still be used, as at present; the telescope does not in any way interfere with the ordinary sights.

Very respectfully,
B. A. FISKE,
Lieutenant, U. S. N.

Forwarded. ————, Commander, Commanding.
Commandant's Office, Navy Yard, Mare Island, Cal.
Forwarded. H. S. Howison, Captain, Commandant.

To this report the following answer was received:

BUREAU OF ORDNANCE, October 19, 1892.
Lieut. B. A. Fiske, U. S. N., Mare Island Navy Yard, Mare Island, Cal.

SIR.—Your report of the experimental test of the telescopic sight has been received, and the results obtained are considered sufficiently promising to justify further trial.

The Bureau, therefore, requests that you furnish it with a description of the sight and its attachments, and of the method of using it; also with the information as to through whom two sets of these sights may be purchased for trial on some vessel at this station.

Respectfully,
WM. M. FOLGER,
Chief of Bureau.

Through Commanding Officer, U. S. S. *Yorktown*, Navy Yard, Mare Island, Cal.

I answered this by a letter giving the information requested.

Up to this time, guns larger than 6-pdrs. had not been fitted to recoil in the line of fire, but I knew that they would be, after a while. So, as soon as I had demonstrated the applicability of my invention to guns that did not recoil in the line of fire, I set about *the much easier task* of demonstrating its applicability to guns that did recoil in the line of fire.

About the first of November, 1892, the late Rear-Admiral Frank Wildes, then a commander, took command of the *Yorktown*. After I had explained my scheme to him and told him what had been accomplished, he became very much interested, and gave me permission to shift the sight from the 6-inch gun to a 6-pdr. on the port side of the quarterdeck.

No opportunity to try the sight for accuracy presented itself; but one afternoon in December, 1892, I fired several shots with my eye at the telescope sight, to show that there was no danger in so firing, and that the sight itself would not be injured.

The *Yorktown* reached New York about the middle of February, 1893. I went to Washington several times during the spring and summer. I found that the Chief of Bureau of Ordnance had realized the advisability of taking up the question of fitting our guns with telescope sights, and that an officer had been placed in direct charge of the matter.

About this time, June 13, 1893, a patent was granted to Lieutenant, now Captain, F. F. Fletcher, U. S. Navy, covering the application of the naval telescope sight to turrets. Fletcher's invention solved the problem in the most complete and admirable way; and in its essential features, it is the method still used.

In July, 1893, I was ordered to the *San Francisco*. I took the telescope sight with me, and fitted it to a 6-pdr. on the starboard side of the after bridge, and then wrote the following letter:

U. S. S. SAN FRANCISCO,

BOSTON, MASS., July 25, 1893.

SIR—I beg to state that I have a telescopic sight fitted to a 6-pdr. on board this ship, and I would respectfully request that a board of officers be ordered to test and report upon it, and also that I be allowed fifty rounds of ammunition for the purpose of adjusting and testing it.

Very respectfully,

B. A. FISKE,

Lieutenant, U. S. N.

The Honorable Secretary of the Navy.

Concerning this the Bureau of Ordnance wrote the following letter:

BUREAU OF ORDNANCE, July 31, 1893.

SIR—1. The bureau requests that you will appoint a board of officers of your flagship to test and report upon the telescopic sight fitted to a 6-pdr. on board the *San Francisco*. Such ammunition as may be required can be expended for these tests.

2. The attention of the board is especially called to the possible advantage of the telescope as a night sight. The report should contain a description of the telescope and method of using it.

Respectfully,

W. T. SAMPSON,

Chief of Bureau of Ordnance.

Commander-in-Chief, North Atlantic Squadron.

In accordance with the above a board was ordered which made the following report:

U. S. F. S. SAN FRANCISCO,
GARDINER'S BAY, N. Y., August 8, 1893.

SIR.—In obedience to your order of August 3, 1893, constituting us a board upon the telescopic sight fitted to a 6-pdr. on board this ship, we have the honor to report as follows:

The sight is one devised by Lieutenant B. A. Fiske, U. S. Navy, and consists essentially of a telescope 24 inches long, of large field and good definition, mounted on trunnions in a quadrupod standard 4 inches high and 4 by 3 inches in area of base.

The telescope is fitted with cross hairs for laying on, which the designer purposes to replace by platinum wires, in order that these last may, for night work, be made luminous by the passing of an electric current.

The telescope is moved in a vertical plane by a worm gear and tension spring and its elevation and depression are shown by graduations for ranges on a disk cast in one with the milled hand hold for operating the worm gear.

As the pedestal of the telescope is rigidly secured to the shoulder piece, no traversing device was needed and none was provided.

A trial of the sight was begun with practice at 2000 yards' range, it having been the intention of the board to have several of the good shots of the ship fire six shots each, using the service sight and the telescopic sight alternately.

All the first few shots fired from the gun laid on with the telescopic sight were wilder than those when the service sights were used, and an investigation of the telescopic sight showed that the worm shaft of the telescope had bent under the strain due to the flip from the gun.

When 11 shots had been fired, the designer withdrew the device from trial, and no definite conclusions as to its merits were arrived at.

The board is very favorably impressed with the ease and accuracy with which a 6-pdr. gun can be laid when using the telescopic sight, and can see no reason why the device should not be very valuable for use with secondary batteries, provided it can be so attached to the shoulder piece as to withstand the severe shocks it would meet in service.

We are, sir, very respectfully,
Your obedient servants,
E. D. F. HEALD, *Lieut.-Comdr., U. S. N.*,
WM. W. KIMBALL, *Lieutenant, U. S. N.*,
F. W. KELLOGG, *Lieutenant, U. S. N.*

To the Commander-in-Chief, Commanding U. S. Naval Forces on N. A. Station.

FIRST ENDORSEMENT.

U. S. S. SAN FRANCISCO,
GARDINER'S BAY, L. I., August 9, 1893.

Forwarded. J. C. Watson, Captain, Commanding.

Firing done with Hotchkiss C/dr fitted with Telescopic Sight.

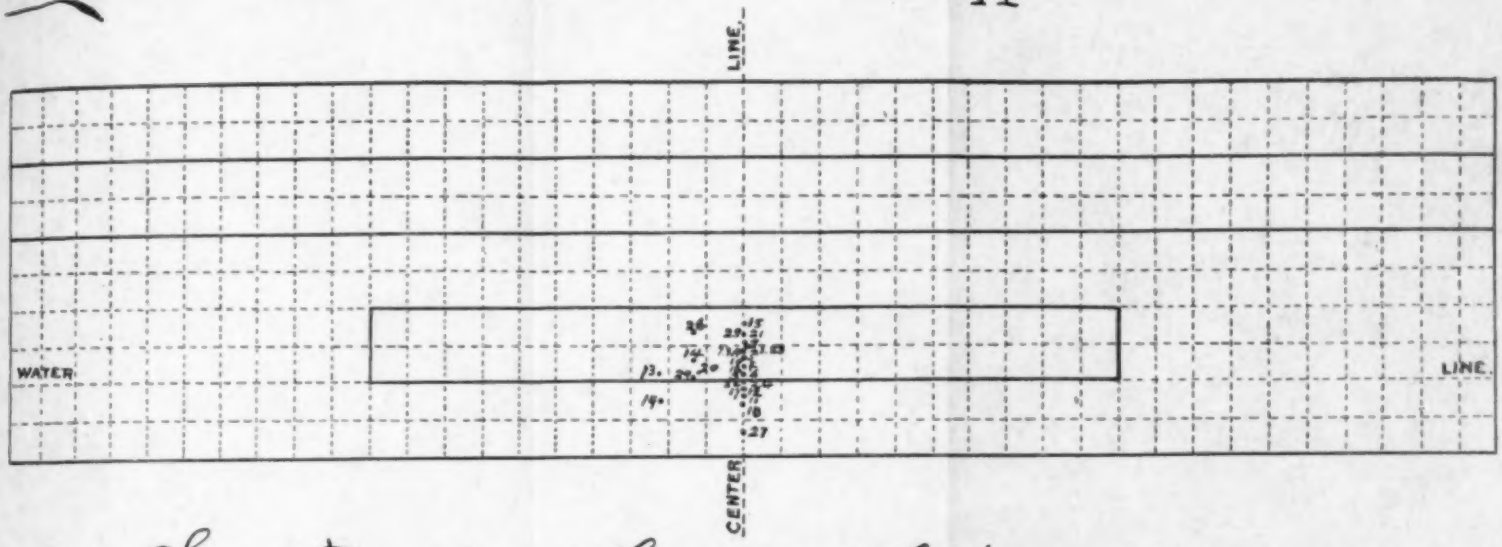
VERTICAL TARGET.

Scale, 1 Inch = 10 Feet.

A

ABOVE

A



U. S. S. "San Francisco", Captain J. C. Watson U. S. N., Commanding.

Distance of target measured by Range Finder Lt. Wilts (apps.) U. S. N.

Observers, Ship Right boat, E. Packard Lt. Q. M.

N. B. 29 shots were fired, each shot counted either 5 or 4. The deviation of the projectile to the right or left as observed from the ship was so small in each case that it could not be measured with any means at hand, it was therefore estimated, using the known dimensions of the target as a reference.

PRACTICE. (Stationary or Moving.)

Shots Fired	Guns Number and Class.	Name of Gun Captain.	Average Time Between Shots	Number of Guns Firing	Limit of Range Yards.	Merit off Target.	Final Merit.
1-10	6 pdr. Hotchk.	Lieut. Fiske		1	1000	100	
11-15	"	Ensign Durell			"	92	
16	"	C. Leimbach, C. T. M.			"	100	
17	"	A. Anderson, T. M.			"	80	
18	"	J. Lacy Armurer.			"	80	
19-23	"	Lieut. F. H. Kellogg			"	96	
24	"	M. Scanlon, B. M.			"	100	
25	"	J. A. Gustafsen Q. M.			"	100	
26	"	J. Smith, Cox.			"	100	
27	"	Capt. Kelton, U. S. M. C.			"	80	
28	"	H. C. Wetherbee, Cox.			"	100	
29	"	W. Snodgrass, B. M.			"	100	
					12	1128 = 94	
			Average of 12 men = 94. (9 of these men had never tried the sight before.)				

Date of Practice: May 7. 1894

Place of Practice: Pearl Bay Lagoon, Hie

Wind and Weather: Fine. Light breeze at right angles to line of fire.

Smoke: Not troublesome.

Rolling and Pitching: Rolling 1° each side pitching very slight.

U. S. N.,
Divisional Officer.

The actual scale of this reproduction is 1 inch = 12 feet.

Firing done with Hotchkiss 6 pdr. Rifled with telescopic sight.

VERTICAL TARGET.

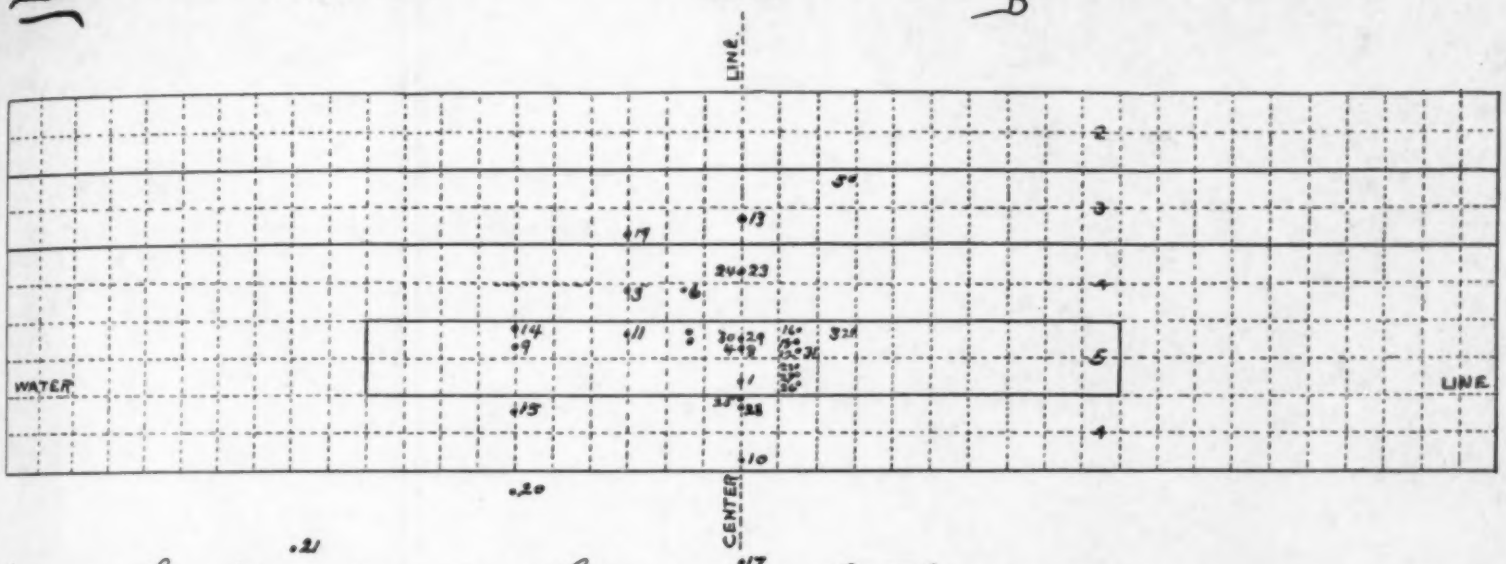
(FORM A.)

Scale, 1 Inch = 10 Feet.

B

ABOVE

B



U.S.S. "San Francisco" Captain J. C. Watson U.S.N., Commanding.

Distance of target measured by Range Finder C.H. Dilts (Appr:) U.S.N.

Observers, Ship. Right boat. E. Packard C.Q.M.

The deviation of the projectile to the right or left, as observed from the ship, was in all cases except that of shot No. 21, so small that it could not be measured with any means on hand; it was therefore estimated, using the known dimensions of the target as a reference.

PRACTICE. (Stationary or Moving)

Shots Fired	Guns Number and Class	Name of Gun Captain	Average Time Between Shots.	Number of Guns Firing	Limits of Range Yards.	Merit off Target	Final Merit
1-4	6 pdr Hotchk.	H. J. Daum (Apl)	—	1	1000	95	
5-8	"	F. Smith (Coy)	—	1	"	85	
9-12	"	C. L. Dooley (Lds)	—	1	"	95	
13-16	"	L. Burke (Lds)	—	1	"	85	
17-20	"	D. McCarthy (Sea)	—	1	"	40	
21-24	"	John Oneefe (C.P.)	—	1	"	65	
25-28	"	C. Thorsol (Mach)	—	1	"	90	
29-32	"	P. Mullany (Boilermk)	—	1	"	100	

8) 655 (81.8 (average of 8 men)

Date of Practice May 8. 1894

Place of Practice Bluefields, Nicaragua

Wind and Weather: Fine. Gentle breeze at right angles to line of fire.

Smoke: Not troublesome

Rolling and Pitching 1° to 2° each side, pitching very slightly.

None of these men had ever used the sight before, except Smith who had fired one shot the previous day. Oneefe and Mullany had made scores on the last quarterly firing with muskets. Thorsol had never before in his life, as he states, fired any kind of a gun, musket or pistol.

U.S.N.,
Divisional Officer.

The actual scale of this reproduction is 1 inch = 12 feet.

SECOND ENDORSEMENT.

U. S. S. SAN FRANCISCO, 2D RATE.

GARDINER'S BAY, L. I., August 9, 1893.

Forwarded. Further tests will be made when Lieutenant Fiske furnishes another telescopic sight, as he purposes to do.

A. E. K. BENHAM,
Rear-Admiral, U. S. Navy.

Commanding U. S. Naval Forces on North Atlantic Station.

During the next nine months no opportunity came for trying the sight. But on May 7 and 8, 1894, the sight was tried by a board, which made the following report. *During the interval no change had been made in the instrument, except that the original worm shaft, that moved the telescope in a vertical plane, had been replaced by another, somewhat thicker.*

U. S. S. SAN FRANCISCO,

NAVY YARD, NEW YORK, July 9, 1894.

SIR.—In obedience to your instructions, we have witnessed target practice with the 6-pounder Hotchkiss rapid fire gun of the ship, fitted with a telescopic sight by Lieutenant B. A. Fiske, U. S. N., and we report as follows:

The target practice was made on May 7 while at anchor at Pearl Cay Lagoon, Coast of Nicaragua, and on May 8 while at anchor off Bluefields Bluffs, Coast of Nicaragua.

On the first day, the firing was done by twelve persons, officers and men, four of them familiar with the use of a telescopic sight, and all of them trained in pointing and firing with the ordinary sight.

On the second day, the firing was done by eight men, only one of whom had ever used the telescopic sight, and he had fired but one shot with it, on the previous day. Two of these men had made zeros in the last quarterly target practice, and one of them had never had any target practice with any sort of firearm.

The fall of the shots was observed, recorded and plotted (Form A) in the regular manner, and the results of the practice are shown in the diagram and data on the two sheets appended and marked A and B.

It seems scarcely necessary to discuss the superiority of the telescopic sight under conditions which admit of its use; that is when the light is sufficient, and the lenses are free from moisture, etc.

It is superior to the ordinary sights just as the telescopic sight of a transit or a theodolite is superior to the alidade or the sight vanes.

The field of view is easily made as large as that for the ordinary VI gun sights with the usual aperture in the shield.

With the telescopic sight, the target is seen clearly with the cross hairs apparently resting on the target itself; all in focus, and with none of the uncertainty arising from more or less coarseness of sight, and in making

alinement of sights, near the eye, with a distant object requiring a different focus.

The operation of pointing the gun (bringing the sight on the object) is as easy as with the ordinary sight, and it is less fatiguing to the eye. In conditions unfavorable to the use of the telescopic sight the ordinary sights are still available.

The mechanical arrangement of the mounting of the telescope was unsatisfactory. The shock of discharge deranged the adjustment and made a new adjustment necessary after each shot.

Lieutenant Fiske offers a new arrangement now, which, it is thought, will avoid the difficulties found with the one used during the target practice.

The mechanical details of the mount which was used and the new one proposed, are shown in the drawings on the sheet appended and marked C.

Respectfully submitted,

T. C. McLEAN, *Lieut.-Comdr., U. S. N.*,
AARON WARD, *Lieutenant, U. S. N.*,
F. W. KELLOGG, *Lieutenant, U. S. N.*

The Commanding Officer, U. S. S. *San Francisco*, Navy Yard, Brooklyn, N. Y.

FIRST ENDORSEMENT.

U. S. S. SAN FRANCISCO, August 6, 1894.

Forwarded. P. H. Cooper, Captain, U. S. N., Commanding.

SECOND ENDORSEMENT.

NAVY YARD, NEW YORK, August 17, 1894.

Forwarded by direction of the Commandant, C. A. Adams, Lieutenant and aide.

"The mechanical arrangement of the mounting of the telescope," mentioned in the third from the last paragraph of the report of this board, did not mean the mounting of the instrument on the shoulder piece of the gun, but the means for elevating and depressing the telescope for changes in range; that is, the combination of the lug under the telescope with the end of the worm shaft that carried the range disc, the two being held together by a spiral spring. This statement is proved by the last two paragraphs of the report and "the drawings on the sheet appended, marked C."

Every time the gun was fired, the lug would hammer the end of the worm shaft violently and make the shaft revolve in its bearings; so that the range disc had to be revolved back every time, and placed at the correct reading. Of course, the revolving of the shaft and range disc were perfectly apparent, and it took only a second to turn them back to the correct range indication.

The report does *not* mean that the telescope sight had to be re-bore-sighted during the trials. I wish to make this point very clear, and to state that neither on board the *Yorktown* nor the *San*

C.

U. S. S. San Francisco

TELESCOPIC SIGHT.

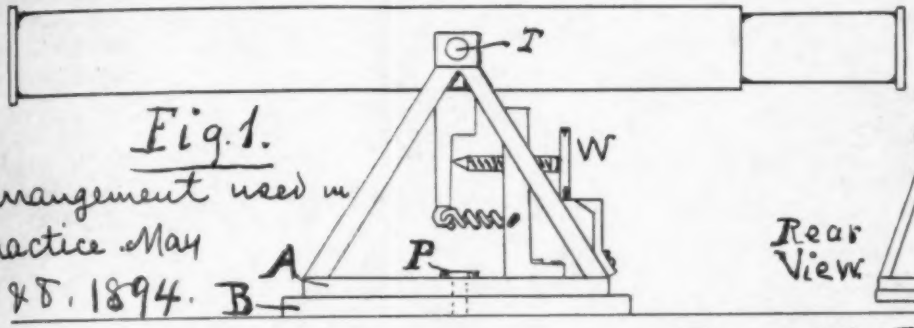
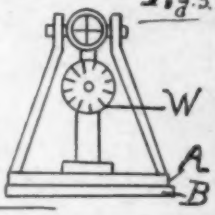


Fig. 1.

Arrangement used in practice May 7 & 8. 1894.

Fig. 3.



Rear View.

Base plate **B** is secured on shoulder-piece stock of 6-Pdr.
" " **A** is pivoted on **B**, and is turned on **B** in azimuth by thumb-screw, - to correct for speed.
Eye-end of telescope is raised by wheel & screw **W**, around trunnions **T**, and **W** is graduated in yards.
Fig. 3. The lower side of **B** is not parallel to the upper side, but is inclined to it at angle of about 2°, so that the left edge is thinner than the right edge. - This causes the up & down cross wire in the telescope to stand at angle of 2° with the vertical, & thus correct for drift.

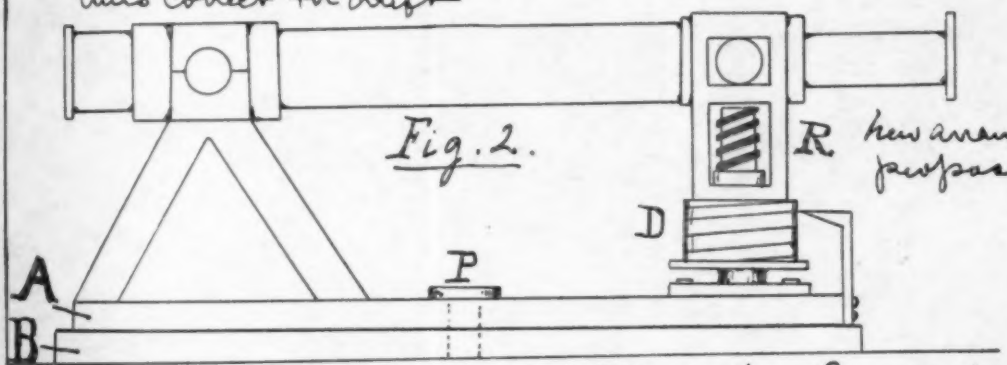
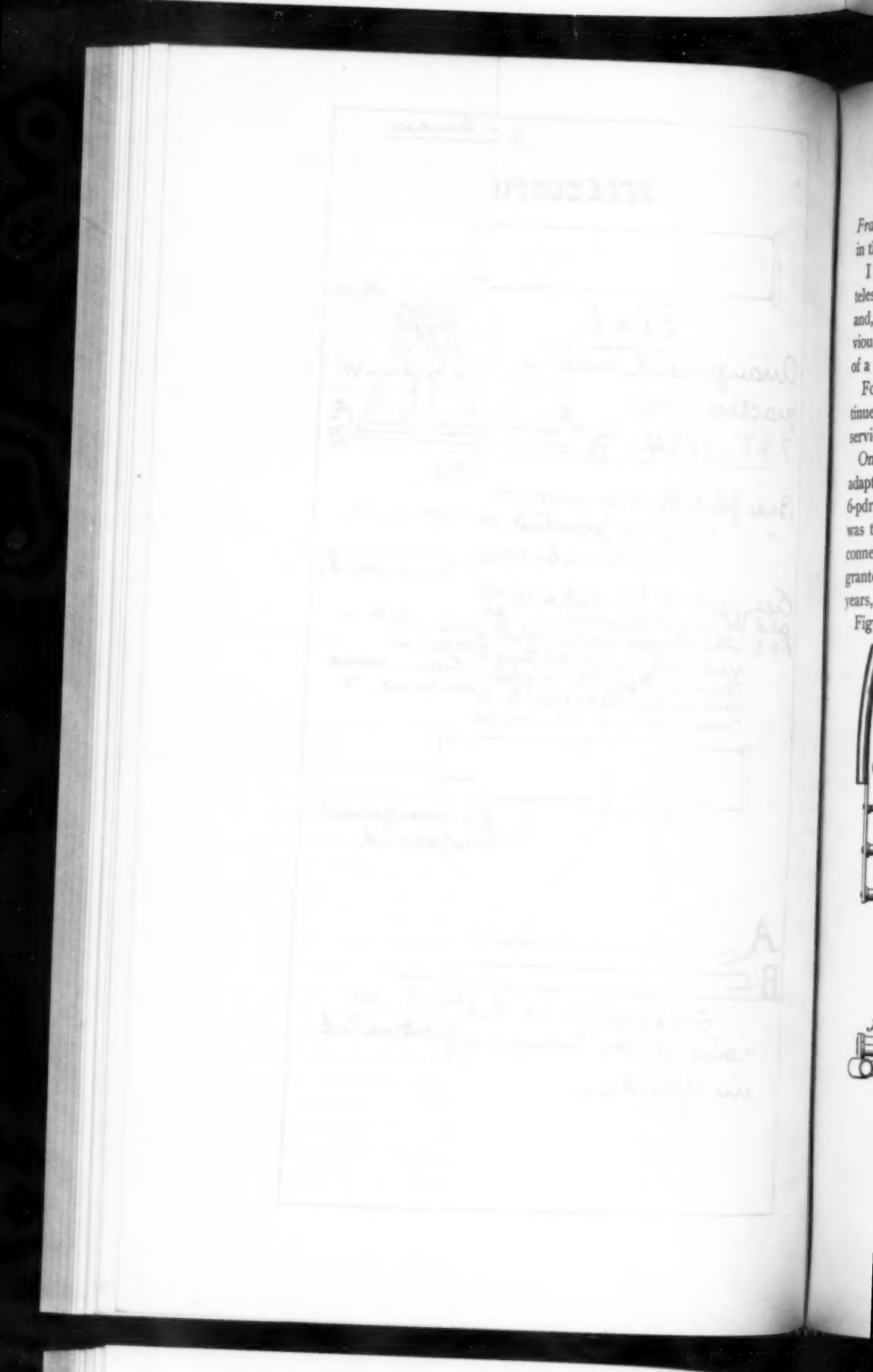


Fig. 2.

new arrangement proposed.

Telescope is held at both ends. Eye end is raised by turning drum **D**, which is graduated in yards.



Francisco was the telescope sight ever jarred out of adjustment in the sense that it had to be re-bore-sighted.

I had noticed the defect of the spring connection between the telescope and the range disc in the trials on board the *Yorktown;* and, in an application for a patent, which I had made a year previous, on May 20, 1893, this arrangement was abandoned in favor of a worm and a worm wheel.

For some reason that I do not know, the spring connection continued to be used in the telescope sights that were issued to the service, until about 1904.

On May 20, 1893, I applied for a patent on the telescope sight as adapted to guns that recoil in the line of fire and as fitted on 6-pdrs. of the *Yorktown* and *San Francisco.* The only difference was the worm and worm wheel connection instead of the spring connection. I had a great deal of difficulty in getting this patent granted. The dispute with the Patent Office lasted nearly three years, and the patent was not issued until April 14, 1896.

Figs. 1, 2, and 3 that follow are taken from the patent drawings;

Fig. 1.

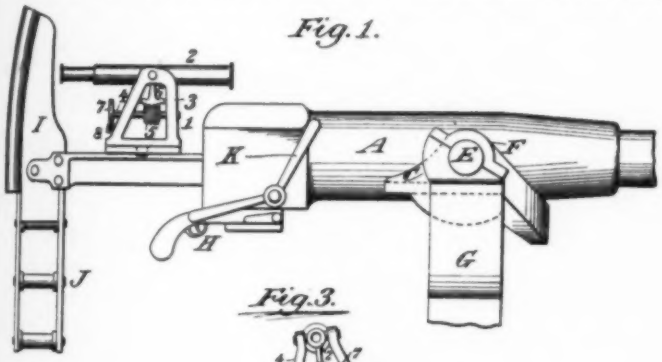
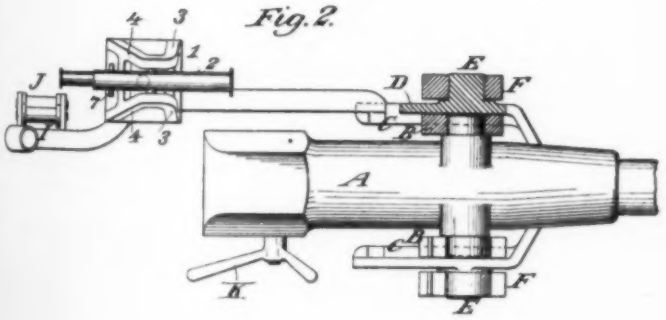


Fig. 3.

Fig. 2.



and claims 1 and 5 show the scope of the patent, as finally allowed, with sufficient definiteness for the purpose of this paper.

Claim 1. The combination of a gun, a saddle whereon said gun slides longitudinally, a support for said saddle constructed so as to allow said saddle to be moved in a vertical plane, and a telescope or sight-bar supported upon saddle, movable on a horizontal, transverse axis, and disposed with its longitudinal axis in a vertical plane parallel to that including the axis of the bore of the gun.

Claim 5. The combination of a gun, a support therefor, and a telescope upon said support, the said gun and the said telescope being movable about their transverse axes, and the said telescope being supported on an inclined base; whereby the line of sight to a distant object from said telescope is corrected to allow for drift of the projectile thrown from said gun, substantially as described.

On May 20, 1895, I applied for a patent of a kind which comprises fully 99 per cent of all patents granted. That is, it was not for an invention in the best sense of the word, but for an apparatus that was an improvement on an invention already existing. It comprehended practically the apparatus shown in Fig. 2 of the report of the second board in the *San Francisco,* the telescope being firmly held near both ends. It was intended to remedy the difficulty mentioned by the board; and the board thought it a good plan, as is shown by the next to the last paragraph of the report.

I had an apparatus made under this patent. The apparatus was exceedingly strong, and is shown in the following drawings. It was mounted on one of the 4" guns of the *New York* some time in 1896. I do not think that it was ever tried.

Concerning the telescope sights that were issued between 1894 and 1904, it would not be proper for me to speak, as I had nothing to do with any part of their design, mounting or installation.

Returning to the article in Brassey, that seems to have been written under the impression that "the new gunnery" originated elsewhere than in the American Navy, it may be pointed out that the American Navy was the first to adopt, not only the naval telescope sight, but also the electrical range indicator. The first ship to be equipped with electrical range indicators was the U. S. S. *San Francisco,* which had an experimental set, consisting of one transmitter and two receivers. The test lasted one year, from July,

FIG. 1.

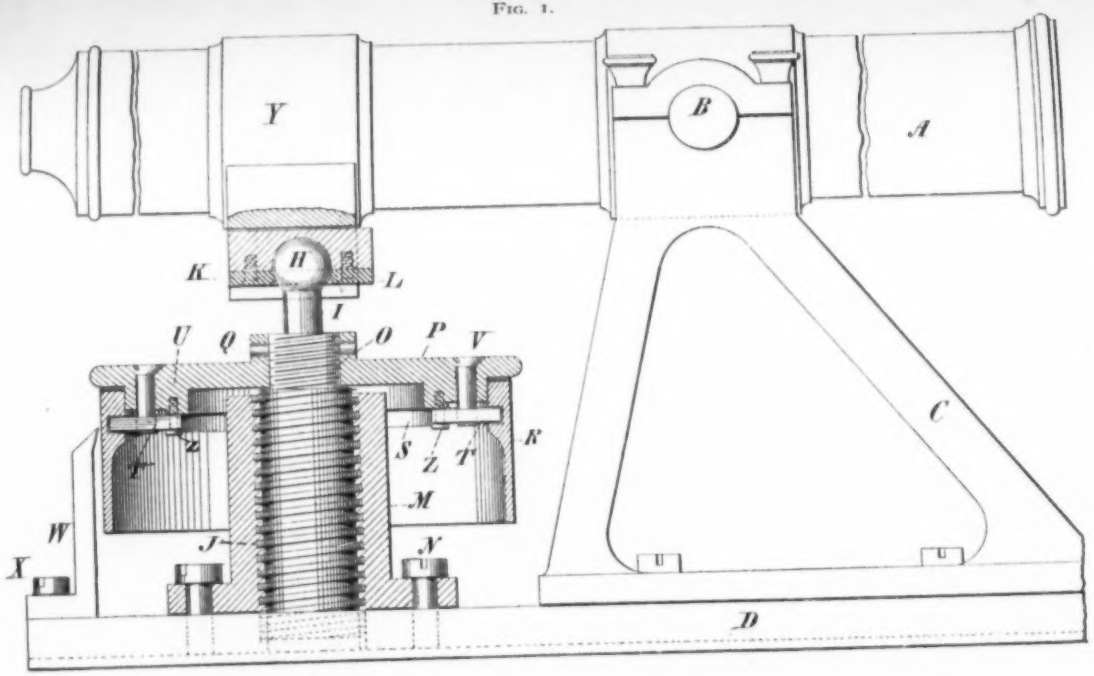

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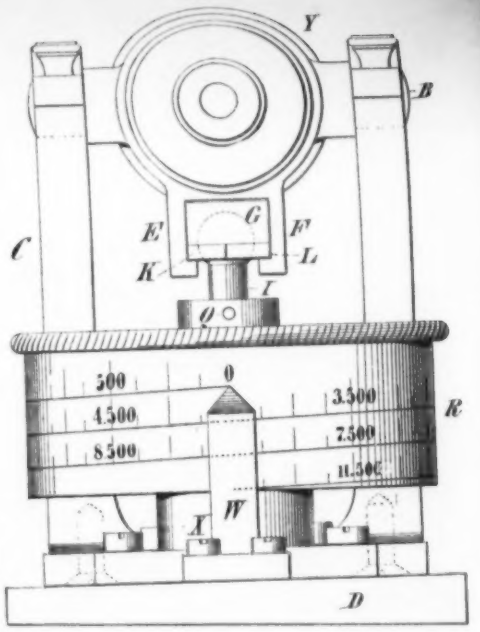
FIG. 2.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X
D

1893, till July, 1894. The test was successful, the electrical range indicator was adopted, and in June, 1896, the U. S. S. *Cincinnati*, *Maine*, *Texas*, *Indiana*, *Massachusetts* and *Oregon* had been equipped with them throughout. The multiple principle of the range indicator then used is still employed, though the form of the instruments has materially changed.

That the success of the naval telescope sight and electrical range indicator in our navy was known to foreign navies before 1898, is suggested by the facts that it could not possibly have been kept secret, and that descriptions and drawings of both, with a statement of the success achieved, were published in the NAVAL INSTITUTE in June, 1896.

Referring again to the impression evidenced in the article in Brassey that the new gunnery originated elsewhere than in the American Navy, it may be pointed out that the first ship to use fire control from aloft in battle was the U. S. S. *Petrel*, at the battle of Manila, May 1, 1898.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

AMERICAN ADMIRALS IN THE BRITISH NAVY.

By CAPTAIN CARLOS GILMAN CALKINS, U. S. Navy, Retired.

INTRODUCTION.

While it is obvious that none of the officers whose careers can be presented under this title were historic figures of the first rank, it may still be worth while to outline their biographies as illustrations of the relations between the colonies and the mother country at different periods and of the conditions of the honorable service in which they bore a part. The annals of a naval commander of the second or third rank may throw more light upon the discipline of the fleet than those of a transcendent genius whose story cannot be told without incessant eulogy, invidious comparisons, and interminable controversy. All the officers whose names are to be mentioned hereafter bore an active and respectable part in the organization and command of a great navy at a critical period, and thus earned honor, though fame may have been missed. Their powers of observation and comparison were increased by the fact that they were regarded as provincials—if not as foreigners—by many of their comrades, as well as by the larger practical experience acquired by those whose youth had been passed among the primitive hardships of life in the American colonies. Under such conditions the American type was rapidly developed and permanently impressed. Some of our heroes lived hardly a decade in the new world, and yet acquired indelible traits of hardiness, thrift, or humor which made them recognizable as Americans to the end of their days. This was particularly notable in those cases where heredity had its influence; but many of the early immigrants were also, for good or evil, promptly Americanized.

It must not be assumed that because a few of the colonists lived to become admirals, there was a constant succession of American

midshipmen, lieutenants, and captains on the quarter-decks of the royal navy. No attempt has been made to reckon the number of those in the lower grades during the eighteenth century; but it can hardly have attained a high figure. The lack of influential connections, the remoteness of the colonies from that "interest" which made or marred the fortunes of all who undertook to serve England in those days, and the virtual independence of the scattered provinces allowed few Americans to enter the army or navy of the mother country and doubtless hindered the promotion of those who received appointments. Had Virginia or South Carolina been as much concerned in nautical pursuits as New England was from the beginning, the proportion might have been different; but as a matter of fact all those whose story has to be related hailed from the northern provinces.

The adverse conditions mentioned above could hardly be overcome except during revolutionary periods. Then the principle of opening a career for talent can hardly be slighted; and the brave and hardy may come to their own. The men under discussion fall into two leading groups: those who returned to England to take part in the Civil War between King and Parliament; and those who were exiled from the thirteen colonies on the eve of the Revolution on account of their loyalty to George III. Both classes occupied a somewhat detached and ambiguous position. The former were rebels after the Restoration; and one of the results of the independence of the United States was the banishment of the Tories and the confiscation of their property. The earlier conditions tended to bring men who had served the Commonwealth back to America; but those who entered the royal navy about 1776 were permanently alienated from the land of their birth, both rewards and penalties keeping them abroad.

All those whose lives are to be chronicled here are named among the thirty thousand notables of the *Dictionary of National Biography* as Englishmen; and the record of their achievement and advancement in the service of the mother country is duly set forth in the series of naval lives so ably edited by Professor Laughton for that indispensable work. Naturally the American phase of their annals has been less diligently explored. Thus the first of the men under consideration has not been connected with Massachusetts, though his shipyard was one of the landmarks of Boston long before he joined the navy of the Commonwealth; and of a

later admiral it is said that he was "born in Canada," thus ignoring the history of a Boston family for four generations. By combining the facts gathered by the faithful antiquarians who have contributed to the *New England Historical and Genealogical Register* with those of the standard authority cited above, it is hoped to enlarge the human and historical interest of the topic without obscuring its significance to students of the naval profession.

MAJOR NEHEMIAH BOURNE.
(1611?-1691.)

The family of this worthy "Commander at Sea and Commissioner of the Navy" must have established itself in London in the reign of Elizabeth. His grandfather was a baker who dwelt near the Tower; his father a shipwright of Wapping. Nehemiah seems to have followed both of these pursuits, but his final calling connected him with the sea. In 1625 his father left him a house in Gracechurch Street, known as the *Pewter Platter,* expressing a wish that the boy should "be a scholar and brought up at the University of Cambridge." Had this been practicable, he would have known Milton at college; but he seems to have gone to work and to have made an early marriage; his wife died in 1684, after fifty-two years of companionship "in various and extraordinary paths of divine providence by sea and land, at home and in remote parts." The wanderings began in 1638, when Bourne got a license, in which he was described as a baker, to emigrate to America. He may have concealed his real trade to evade the restrictions then imposed upon recruits for New England, where the arrival of a shipwright might have a certain importance.

Special license was required, as the authorities were resolved to "prevent the frequent resort to New England of divers persons ill-affected to the religion established in the Church of England and to the good and peaceable government of the State." Complaints of "the unruly and factious disposition" of the men of Massachusetts had reached the Court within five years of the landing of Winthrop and his followers; officials had argued that trade would be spoiled by emigration, that men in debt would go abroad and become Puritans to evade payment, and that the colony was bound to be disaffected. Endicott had startled the loyalists when he "cut out the cross from the flag or ancient which they carry before them when they train" at Salem; and warning was

sent home that the settlers would fortify themselves and make alliance with their Dutch neighbors at Manhattan. Winthrop and his followers had got the charter and government into their own hands, thus escaping from the bondage of a company of proprietors in London; and it was reported that they would refuse obedience if Charles I sent over a governor; some of them were even accused of saying that if a drunkard were sent to rule them, he would be put in the stocks and sent back to England. Massachusetts had advocates in London, and one of them tried to reassure the public: "It is a causeless fear without precedent that a colony planted in a strange land was ever so foolishly besotted as to reject the protection of their natural prince." Whatever Roman or Spanish history might suggest to the contrary, it is plain that the Puritans meant to claim the right of self-government as soon as they had established themselves firmly in the New World. Meanwhile, they were content to profess a guarded loyalty as long as their English allies were not excluded from power. The Stuart policy of restriction forced emigrants to rely upon the Parliamentary opposition for justice, and thus kept their eyes fixed upon the strife of parties which was to bring on the great Civil War.

In 1639, Bourne returned to England on a trading voyage, and he wrote from thence to Governor Winthrop that he was still looking towards Massachusetts, "that good land, and not altogether without some breathings and longings after those precious liberties once enjoyed (though very unprofitably)"; and he appeared in Boston as part owner of a ship the next season. He then became a freeman of the town, which shows that he belonged to the dominant Congregational Church. Yet he joined three or four leading Puritans, men destined to render notable service in regions remote from New England, in asking to have the liberties of the colony extended to those who were Baptists or members of the Church of England; the curtness with which the General Court dismissed this plea may have helped to detach Bourne and Sedgwick from their townsmen.

In 1643, Bourne went to England and served as major of a regiment of horse in the Parliamentary army. Though his service in that rank lasted less than two years, as he did not join the New Model army organized by Cromwell, the military title became so inseparably attached to his name henceforth that neither naval promotion nor retirement to civil life could cancel it. After serv-

ing in the Boston militia with similar rank, Bourne borrowed six guns from the harbor batteries and sailed on a trading voyage in 1646 with his wife on board. Writing from Newfoundland two years later, he protested to a friend in Boston that he had sailed without any purpose "to pluck up my stakes, or to disjoint myself from you." Nevertheless, he was not to see New England again, though he kept up relations with some of its inhabitants for the next thirty years. His migration must have been resented by some of his associates: Winthrop, for one, had intense convictions against "the liberty of removing for outward advantage," though he could not keep his son from serving in Cromwell's army; "ask thy conscience if thou wouldst have plucked up thy stakes and brought thy family 3000 miles, if thou hadst expected that all, or most, would have forsaken thee." His conclusion was that it would be safer to "choose rather to suffer affliction with thy brethren, than to enlarge thy ease and pleasure by furthering the occasion of their ruin"; thus did the strongest personality of the first century of American history seek to build up local patriotism at the expense of the larger interests of causes and empires by branding desertion as treasonable and base.

During the first Civil War, which resulted in the total defeat of the King's party by 1646, the Parliament had had command of the sea; the port towns had adopted the popular cause; and the navy, though not inspired by the political and religious zeal which characterized the soldiers of the New Model, had in general been loyal to the leaders of the revolution. But in 1648 an indiscreet appointment to the command of the squadron in the Thames, coupled with the intrigues of the royalists and the moderate or Presbyterian party in England and Scotland, led the crews of a dozen ships to revolt and carry them to Holland where the future Charles II took them into the King's service. This mutiny brought about the complete reorganization of the navy, and opened a career for practical seamen of Puritan antecedents, though the higher rank of General-at-Sea was reserved for soldiers of approved ability. While serving in that capacity, Blake set up a new standard of energy and courage for naval commanders; and Monk rendered services of vital importance to the Commonwealth. For the first time in the history of the British Navy, business principles prevailed, and men were valued according to their capacity for public service. Parliament had begun the war by appointing

a nobleman as Lord High Admiral after the fashion set by the Tudors and Stuarts during the previous century. But the Earl of Warwick had had practical experience as a privateer—to say nothing of his active patronage of piracy in the East and West Indies—and he thus combined the qualities which had made both Howard and Drake indispensable to Elizabeth in 1588. He was able to recall most of the deserters to the service of the Commonwealth before he resigned his command to the new generals in 1649. The remnant sailed with Prince Rupert on a four years' cruise which must be regarded as piratical.

Among the new captains of 1648 were two shipwrights of Boston, both of whom were soon to rise to flag rank. Thomas Graves, who had been master of the *Trial* in 1645, was killed while serving as Rear-Admiral of the *White* in the fleet with which Monk defeated the Dutch on July 31, 1653. Nehemiah Bourne reached the same rank a year sooner, but he had become a civil commissioner of the navy before this action was fought. His brother John remained afloat, however, and became a rear-admiral after Monk's victory. The navy could not be enlarged to strive with the Dutch without accepting the services of every man fit for command; and some of those who fought in defense of their country had been notorious as buccaneers in an earlier decade. No prince had ever been scrupulous about employing or advancing men of that type when their services were needed; and the names of notorious pirates appear in the roll of captains under Charles I as well as in that of the fleet which shattered the Armada of 1588. Neither captains nor admirals of that age served the nation under a permanent commission, and many of them were forced to seek a livelihood during peace by more or less disreputable adventures.

Bourne commanded a squadron on the coast of Scotland during Cromwell's and Monk's victorious campaigns against that country between 1649 and 1651. His most conspicuous service was the transportation of the crown jewels from Stirling Castle to London, and for this the Parliament gave him a medal worth £60. He thought that the commander of a dozen ships might have been paid at a higher rate than twelve shillings a day, and protested that he lost money by his employment.

The great day of his life came on May 19, 1652, when Blake and Tromp met off Folkestone and began to bicker about the

honor of the flag. The Dutch outnumbered the English three to one when shots were fired to compel them to strike the States' colors. Tromp had lowered his topsails to Blake, but he hesitated over the flag and returned a broadside when Blake's shots began to take effect. The signal for action, a red flag under the ensign, was then displayed; and an unlucky Dutch captain told Bourne that "when he saw the Admiral's red flag hung out, he perceived they were in earnest and did the best he could"—as a fine old petty officer of our navy said he and his comrades had done when driven to fall back on a wood pile in Korea by the police of one of the consulates. Bourne was in command of a detached squadron of ten ships, and he had been in communication with the Dutch fleet off Dover on the preceding day. They had been warned of the Parliament's order about the flag, and assured by Bourne that "whether they intended war or peace, it did not signify much" to him, but that the hand of God might punish whoever caused the first breach. The orders of the two admirals from the States and the Parliament respectively rendered a collision inevitable, and the temper of the seamen was such that it was welcome to many.

Bourne sailed from the Downs at noon to meet Blake in the Channel, having "calculated the time and tide" for joining forces. The wind was easterly, and the Dutch fleet was seen "half Channel over plying to windward"; the major thought that Tromp "would have plied homewards to avoid striking, but very suddenly he bore up and made sail" towards Blake's squadron. By four o'clock it was noted that the Dutch admiral had "put abroad his bloody flag" and was firing broadsides; "upon which every one of us addressed to the engagement, according to that God called us unto, their ships generally firing upon us first." Bourne's attack was not made without regard to tactical principles, though he had never fought a naval action before: Tromp and his van had shot far to leeward in closing with Blake; "and so left the rear of the fleet to us, which we endeavored to sever from the rest, and accordingly did in part break the body; and some of us who were the nearest, and had the advantage of the wind, fell upon the sternmost, who, I suppose, found it hot work." They were divided into two or three parts and "shuffled themselves into clusters" under the English fire: "What execution we did upon them they best know, I shall not determine it; but surely they were sensible of us, for they did their utmost to decline us, and avoid our coming

near, which we endeavored by all means." The English ships had foul bottoms, and the pursuit was ineffective. Nevertheless, Bourne took two prizes.

Blake's fifteen ships had been in the midst of their foes when the action began with the firing of musketry as well as broadsides; and his flagship the *Old James* had to shorten sail and man both batteries. Nothing but Bourne's resolute attack saved the general from being overwhelmed by Tromp's forty sail. The disorderly advance of the Dutch indicates that they had no deliberate purpose of engaging. Tromp was no novice in naval warfare; Bourne himself had written a glowing account of the skill with which he had disposed his 120 ships to cut Oquendo's fleet out of the Downs after a month's blockade in 1639, so that twenty-four Spanish vessels had been driven ashore and a larger number sunk or captured. Tromp's own story was that he had steered toward Blake to protect a convoy of Dutch merchantmen from being searched by the English; but it does not follow that he kept his temper when summoned to strike his flag. He wrote to Blake the day after the fight, "so as to recover the ship we took from him, and makes a very lame excuse for the breach made by him"; and Bourne thought it an aggravation that the letter was in French. Blake would send no other answer than an assurance that the Parliament "will keenly resent this great insult and the spilling of the blood of their unoffending subjects, and that you will moreover find, in the undersigned, one ever ready to carry out their commands." With the sober General-at-Sea in this temper, and with Cromwell joining his brother commissioners in a report which put all the blame on the Dutch, war was inevitable, though the future Protector had hoped to avoid that complication. Bourne was an eager advocate of militant action, holding that the English commanders were "guiltless before the Lord and men."

The ensuing contest may be regarded as the first naval war carried on according to the principles which Nelson was to develop to the highest efficiency. The admirals on both sides were no longer courtly amateurs of the Elizabethan type; De Ruyter and the Tromps were seamen of the most heroic temper; Blake and Monk had learned the principles of war and acquired the habit of command ashore, and with the help of nautical experts like Penn, Goodsonn, and the Bournes, and with the backing of civil administrators less subject to corruption than any board which had charge

of naval affairs in that century, they were capable of contending for the mastery of the sea, whether the enemy were Dutch, French, or Spanish. The remnant of the naval contingent which had clung to the King's party was still abroad, but the royalist privateers had become so addicted to indiscriminate pillage that they could do little to strengthen the fleets arrayed against the Commonwealth. Both England and the Netherlands had to rely upon impressing ships and sailors for war purposes; the majority of the vessels in the huge fleets which were employed were merchantmen; and these were often commanded by their original masters until it was found that they had more regard for the interests of the owners than for the public service. After Blake had been deserted in action by the "cowardly captains of the merchant freebooters," it was decided to restrict privateering and to rally the maritime forces of the nation under the command of regular naval officers, even though commissions had to be given to men unfamiliar with the traditions of the service.

The first important battle which took place after war was declared was that fought off the Kentish Knock on September 28, by the fleets of De Witt and Blake. The Dutch admiral was an unpopular and arbitrary commander, whose notion of naval tactics is preserved in the phrase "Get them into action anyhow, and let the Devil bring them out." The fight began in the old fashion by the charge of the rear-admiral's squadron: "First Major Bourne with the *Andrew* led on, and charged the Hollanders stoutly, and got off again without much harm," though the spars were much maimed. Blake, himself, carried the *Sovereign* into the thick of the fight, "giving and receiving broadsides, and so ranged to the length of the Hollanders' fleet," losing only three men. Penn, the only sailor who became a general in the navy of the Commonwealth, got aground on the shoal, and was late in closing with the enemy. The fleets drifted apart during the night, and De Witt decided not to engage the next day; he had been overmatched from the first; and a dozen of his captains had deserted before dawn.

As the endurance of the Netherlands depended upon the protection of commerce, Tromp had to be restored to command and sent to convoy the trading fleet to the Bay of Biscay. Blake weighed from the Downs as soon as the enemy was sighted, and the two fleets steered to the westward until they drew together

off Dungeness on November 30. The only tactical scheme was to charge by divisions, each ship following the flag of its admiral; and though Blake had hardly half the force of his antagonist, about forty ships against eighty, he did not wait to rally his squadrons, but charged at once with the red squadron. His flagship, the *Triumph*, lost her fore-topmast and was too much crippled aloft to rescue her consorts the *Garland* and *Bonaventure*; these ships had grappled the formidable *Brederode*, but the Dutch rallied to support their admiral; and both the English captains were slain and their ships carried by boarding, though the defenders blew up their decks. Blake's report did not insist too much upon Tromp's manifest superiority in force, but attributed the defeat to the "baseness of spirit" of some of his captains and to his own "insufficiency"; and he begged "a discharge from this employment" in order to avoid "reproach and contempt of men, and disservice of the Commonwealth." If Tromp ever carried a broom at his masthead, it must have been in the winter of 1652; but there is no reason to charge him with any such act of vanity. Doubtless he realized the task which lay before him when the English should have repaired damages and restored discipline in their fleet.

For this work the best talent in the navy was required, and it was decided that Nehemiah Bourne could render more important service as a naval commissioner, or commandant, at Harwich, the North Sea rendezvous of the fleet, than he could by cruising as a rear-admiral. Doubtless Sir Henry Vane, who had been governor of Massachusetts in his youth, and was now chairman of the Admiralty Committee, was aware of Bourne's merit. Under the direction of that board, the management of the dockyards was left to the navy commissioners. Of these Mr. Oppenheim, the best authority, writes that they bore the brunt of the administrative work "with a personal eagerness to ensure perfection, and a broad sense of their ethical relation towards the seamen and workmen, of whom they were at once the employers, with a success the Admiralty never attained before and has never equalled since"; in correspondence with their superiors, they adopted a tone "which would hardly have been endurable but that it was excused by an obvious honesty, and justified by superior knowledge." That Bourne earned his share of this high praise, there is plenty of documentary evidence.

The major was not the only commissioner of New England antecedents. Captain Robert Moulton, who died in that rank after several years of naval service afloat and ashore, appears to have been the shipwright who went to Boston with Governor Winthrop in 1629. Francis Willoughby emigrated to New England in 1638, but returned to serve the Parliament; and in 1651 he was appointed to succeed his father as navy commissioner at Portsmouth, where he acquired credit enough to be elected to one of Cromwell's Parliaments. The Restoration was followed by his return to Massachusetts; and he was chosen deputy-governor of that colony during the last five years of his life, which ended in 1670.

Before taking up his station at Harwich, Bourne had to supervise the payment of money to the fleet; and he embarked in January, 1653, in a "light-horseman"—some sort of barge or wherry—to carry £25,000 down the Thames in a fog. A month later, just after Blake and Tromp had fought again in the Channel, he was at Dover, sending out vessels to bring in the "lame and lagged ships" of the Dutch. Considering that Tromp had fought to protect a convoy of 200 ships, these were fewer than might have been expected, estimates varying from thirty to fifty. These had not been won without a struggle; Blake's flagship had heavy losses, and the general himself was wounded. So too was Rear-Admiral John Bourne, who had been forced to blow up his deck to get rid of the Dutch boarders, one of whom cut him down with a pole-axe. Immense labor was imposed upon all concerned in the equipment of the fleet by the damage done in this action. Bourne found the men of Dover given to robbing the State, and he labored hard to recover the coils of rope embezzled from the prizes. One of the Commonwealth's frigates was burned by a thief who dropped a candle into her powder, and her brass guns were melted.

Recruiting involved as much hard work as refitting; and Bourne was at sea in April to intercept the Newcastle colliers and press their men; he made the impatient skippers strike sail and anchor by firing forty or fifty shot at them, and proceeded to dig out their crews. The same process was to be repeated with 140 more of the colliers bound for London: "I am armed against all complaints and clamors, the necessity of affairs calling for it." In June he sent 700 soldiers to the fleet in the North Sea, along

with 120 sailors taken out of Badiley's squadron which had been fighting in the Mediterranean. He had pickets on the roads about Harwich to waylay seamen who tried to march to London, and he had to ask for guards for the fort where he kept mutineers in confinement and even for a troop of horse to prevent wholesale desertion. Something was accomplished by a daily muster on board all ships at Harwich, with a fine of two shillings for each absentee to be shared among those present. Bourne was in favor of paying the men as soon as the ships came in, so that they might buy clothes; but funds were not provided; and he had to ask whether they were to be paid when they were in "the Rolling Ground, or half money now and half when they are out?"

Parliament had done its best to assure the seamen of fair treatment by framing rules for the division of prize-money, increasing the rate of pay to twenty-five shillings a month, nearly four times as much as Elizabeth allowed her men, and allowing "gun-money" for the destruction of Dutch men-of-war. The principle of these measures was sound; and Bourne reported in January that he found most of the crews in hopeful temper and ready to answer for the encouragement given them by the Parliament. Still there were some who would not wait for their pay; and the inevitable lapse into the wretched practice of paying them by tickets made mutinous demonstrations altogether too frequent.

Besides the wrongs the seamen were called upon to endure in connection with impressment and delay in paying wages, they were grievously annoyed by defects in their victuals and drink: Beer was one of the problems of the naval administrator in that age; and Bourne had large quantities condemned as unfit for the fleet. Yet he opposed a proposal to send wine as a substitute because it had "no body for making beverage"—that is, it would not bear watering. For service in hot countries, however, 200 tuns of Spanish wine had to be provided at a cost of £2000 in 1654. Harwich was full of invalids and prisoners throughout the war, though Bourne thought it an unsuitable place because the water was brackish and the wretched ale-houses furnished miserable lodgings. Willoughby had urged the erection of temporary hospitals at Portsmouth and the employment of nurses and a surgeon, who might be paid "by the year or by the cure"; and large expenditures were made there and at other seaports for the care of the sick and wounded. Pensions were also allowed to

widows and orphans; but the arrears of pay were not provided for; and when prize-money was diverted to satisfy other claims the natural indignation of the seamen was bound to cause trouble. Financial methods were not yet capable of standing the strain imposed by naval campaigns; and not even the great Protector could find money to pay off the fleet. Cromwell actually argued that it was cheaper to send a squadron to the West Indies in search of Spanish treasure—without a declaration of war, moreover—than to pay off arrears in wages.

In their effort to allay suffering, the navy commissioners had the help of Elizabeth Alkin, otherwise known as "Parliament Joan," who undertook to rescue the invalids from the horrors of their crowded quarters and to have them shaved and clad in clean garments, as well as to find food and medicines for them. At Harwich, where Bourne kept her to wait for the next battle in the North Sea, she spent all the money he could supply—and the last penny of her own; "I cannot see them want if I have it." The Dutch prisoners were not beyond her charity; "seeing their wants and miseries so great, I could not but have pity on them, though our enemies." Bourne pointed out that many of them were boys or aged and infirm people, "neither able nor willing to do any service," and advised sending them home to reduce charges. One has to be more or less familiar with the records of the British Navy under Buckingham and the preceding Lord High Admirals to realize the growth of humanity disclosed by these simple suggestions.

Two great battles were fought in the North Sea during the summer of 1653. Blake was at sea on the second of June with 100 ships, and Tromp opposed him with a like number. The English refrained from charging the enemy, and fought in a formation which allowed them to second each other, though they were not yet arrayed in line ahead; and the result was a substantial victory. The three generals were in one ship during the action; Deane was killed; and Blake had to be sent ashore as an invalid whom the surgeons could not heal on account of his age. He was really fifty-four, with four active years and his most notable exploits in the future. For the last fight, Monk led the English fleet when Tromp was encountered off the Texel on July 31. In trying to weather the enemy, the *Brederode* broke through the English line; and when the smoke of her broadsides settled, it

was seen that the signal for a council was flying. The admirals who obeyed it found that Tromp had been shot dead by a musket-ball. Even at this extremity, the great seaman had done his part by breaking the blockade and releasing De Witt's squadron and a great fleet of merchantmen. But without his guidance his fleet could not be saved from a disastrous defeat. Monk's ships had suffered too much to keep the sea, but they were in better case than the Dutch and the States-General had to negotiate with Cromwell—who had at last got rid of the Long Parliament—for a peace. For a time, the Protector was disposed to revive the plan of uniting the Netherlands to Great Britain, or to organize a maritime ance for dividing the East and West Indies between the English and the Dutch on lines similar to those established for Spain and Portugal by the Bull of Demarcation in 1493. But his demands were reduced to the payment of certain indemnities, and the invasion of the West Indies was undertaken as an independent operation which should provide the English Navy with employment and with funds for the payment of arrears in wages.

At the outset of his career as a navy commissioner, Bourne had asked for "something by way of distinction abroad," something to give him countenance and "quicken the work." Perhaps he hoped to retain the rank of rear-admiral while serving ashore—although there was no precedent for that; he added bluntly enough, "I ask it for the service, for I am past such toys as to be tickled with a feather." When the fighting was over he returned to the charge, protesting, with something of the "self-conscious magnanimity" which characterized Milton, "I do not serve for wages, or expect to increase my outward estate;" having served "the honest interest of this nation heartily, ever since I was called thereto, both by land and sea . . . . out of an apprehension I have of a necessity lying upon me to act with all my might," he wished to preserve what he had on entering the service. He had saved hundreds of pounds in buying masts and timber for the navy—a remark which led a biographer to assume that he had been in the Baltic trade, but which plainly relates to his New England experience—"which every man is not capacitated for, nor the combined toil of body and mind that hath attended me in these negotiations at Harwich." There he had "willingly taken up any man's work," and he had not been frugal

in entertaining officers. Nor had he hesitated to give orders to ships when the generals were absent. He was content to let his private affairs lie dead as long as the war lasted, but he thought his family "ought to be treated tenderly."

There had been urgent need of spars for the navy; and Bourne had been invited to arrange for purchasing a supply in New England. Of the three ships which sailed to carry out this contract, two were taken by the Dutch, and one was lost at sea. Bourne reckoned his loss at £1000, and he asked for a Dutch prize or two to recover something by reprisal or to bring home the masts. The Protector and the Admiralty did something to satisfy these petitions: Bourne was paid as a rear-admiral at the rate of a pound a day from the time his ship began to wear a flag in the Downs; an allowance of £160 was also made for his good service at Harwich; and his accounts for an expenditure of £9000 were approved with some reward for excellent book-keeping. These favors did not altogether content the commissioner: He had worked hard when he was not fit to venture abroad in driving "a backward and dull generation, devoid of reason and conscience"; and he thought that his resolve not to "drive on private design under public pretences" gave him higher claims than other officials; so he wrote at last, "I shall sit down in silence, but the world is very unequally divided."

The major sometimes regretted that he had not been allowed to hoist his flag again after the Portland fight; but he did not go to sea during the war with Spain which followed the raid on Santo Domingo and Jamaica in 1655. It had been proposed to send him to cruise with Blake when Vice-Admiral Lawson was dismissed on account of his republican opposition to the Protectorate; but the place was given to young Montagu, a colonel of horse and one of Cromwell's neighbors in the country, who was destined to be rewarded with the title of Earl of Sandwich for leading the navy to support Monk in bringing about the Restoration. He was one of three men who were admitted to intimacy both by the redoubtable Oliver and the merrily irresponsible Charles II; and he will be remembered for ages as the "My Lord" who patronized Samuel Pepys and won a place in the "Diary." Bourne's part in the Spanish war was not conspicuous, though it does not appear that he joined the captains who protested against the piratical invasion of the West Indies. Other-

wise, he would hardly have been admitted in 1657 to share in the victualling contract with his brother commissioners.

The Restoration had to accept the services of such of the Puritan captains as held commands afloat at the critical moment; but the Navy Committee and its administrators were proscribed men after May, 1660. Vane was sent to the Tower, and in 1662 to the scaffold, in spite of an able defense. Willoughby went back to Boston, and was duly honored there. Bourne prepared to sail with a license "to transport himself and his family into any of the plantations"; and the standard authority states that he "emigrated to America"; but an informer asked for a warrant to search the ship of this "enemy of the late King, who is endeavoring to export treasure." His plans having been thus baffled, he fled to the continent; and in writing to John Winthrop, Jr., in 1662, he gave his reasons for not returning to New England; he had been overreached by some of his associates in business, he thought, and he found "much reason to lament the severe and narrow spirit" manifested in New England. Bourne had not forgotten his early plea for toleration—one who had been the associate of Cromwell and Milton was not likely to revert to narrow principles—and his wanderings in Europe lasted for some years.

In 1672, Colonel Goffe, the famous regicide who found refuge in New England, after having been one of Bourne's colleagues in the administration of the navy, was informed by his wife that "Maggarborn"—so had the major's name and rank come to be blended—was offered pardon from the King, with the privilege of living quietly in England, "no oath being imposed." The wars with the Netherlands had reminded the King and his Council that if Bourne and his friends remained in exile, "the conduct and advice of such persons might have been of no small prejudice to us and advantage to the enemy." The Puritan refugees are not accused of allying themselves with the Dutch during the war which began in 1664, and their conduct was far less liable to reproach than that of the Cavaliers who had undertaken to support their wandering princes by depredating upon English commerce during the preceding decade and had carried hundreds of prizes to the ports of France, Spain, and Flanders.

While the date of Bourne's return to London is unknown, it appears that he was living there quietly in 1683, and that he kept clear of plots, though described as an "obstinate indepen-

dent." His wife died there in 1684; and he ventured to record his naval services on her tomb-stone. The expulsion of James II from the throne might have restored him to the navy had not his years forbidden; in 1689 a Major Bourne was invited to attend at a meeting of the Admiralty Board, "who wished to discourse him about some business relating to their Majesties' service." His advice may have been found valuable, as a commission was drawn up for Nehemiah Bourne to command the *Monmouth* in 1690; this may have referred to the son rather than the father; but neither of them took service under William and Mary.

The veteran died in 1691; he described himself in his will as a merchant of London; and many legacies were distributed. A hundred pounds was bestowed upon "needy persons and families, especially such as fear God and are of sober conversation, respecting especially to shipwrights and seamen in and about Wapping." This testament shows that Bourne had neither renounced his faith nor his trade; while his wife's epitaph displays an honest pride in his career as a commander-at-sea. Remembering the great day when he rescued Blake from defeat and drove through the midst of the shuffling clusters of the Dutch at the sight of Tromp's red flag, we are bound to credit him with both forms of courage, with coolness in action and eagerness to assume responsibility. His record as a naval administrator confirms the verdict; and we can hardly blame him for seeking wider opportunities than those of a shipyard in the North End of Boston, or for pointing out the narrowness of the system under which Massachusetts was governed. Nevertheless, it may be argued that the best elements of the navy commissioner's character were the results of a stern apprenticeship under the rule of the elder Winthrop.

SIR CHARLES WAGER.

(1666-1743.)

With the addition of some remarks concerning his ancestry, the biography of this distinguished officer may serve to connect the navy of the Commonwealth and the Restoration with that of George II, under whom Wager held the position of First Lord of the Admiralty for nine years. He was the son of Captain Charles Wager, who held various commands in Cromwell's fleet and in that of Charles II, and he was also the grandson of Vice-Admiral

William Goodsonn, an eminent Puritan commander who seems to have been forced to emigrate to America to avoid persecution at the hands of the Stuart princes and their partisans and informers.

When the navy consented to follow the example of Monk and his officers in promoting the Restoration of the King in May, 1660, Montagu took command of the fleet and sailed to Holland to bring home the exiles. Captain Wager accompanied him in the *Yarmouth,* and, like the majority of his comrades, consented to serve the new régime as loyally as they had obeyed the Protector, since the nation had manifested a desire for the change. When the princes embarked in the *Naseby* her name was discreetly changed to the *Royal Charles* to mask the remembrance of Oliver's victory—a shift which did not save the ship from being carried out of the Medway by the Dutch in 1667—and the arms of the Commonwealth were effaced from the flags. For one day there was "nothing in the world but giving of guns," Mr. Pepys reported; and the ships got under way for England "with pennants loose, guns roaring, caps flying," and the cheers of the swarming crews. Charles always posed as the seamen's friend after this experience—though he never had any scruple about diverting their pay and prize-money to satisfy the demands of closer favorites; and his brother, the Duke of York, became Lord High Admiral and applied his limited capacity to the task of reorganizing the navy.

This would have been impracticable had the bill "making all men incapable of employment that had served against the King," been enacted as proposed. As Sir William Coventry told Pepys, the Cavaliers had for twenty years "either given themselves over to look after family and country business, and those the best of them, and the rest to debauchery." Of the half dozen royalists who might prove fit for command, the most had been notorious for depredating upon English commerce during the Spanish war as well as during the Civil Wars which had terminated in 1651. Nevertheless, all those of that party named by Coventry were duly commissioned as flag officers or appointed to the Navy Board, and most of them were honored with knighthood. Like honors and rewards were bestowed upon certain admirals who had been discarded by Cromwell, and the Duke made some of them his professional advisers. These men are characterized deftly enough by Clarendon, who had often been bored by their

counsels: Sir John Lawson, whose republicanism had annoyed Cromwell, was though "a perfect tarpaulin, a very extraordinary person"; Sir George Ayscue "was a gentleman, but had kept ill company too long, which had blunted his understanding, if it had been ever sharp,"—a remark which may show why Ayscue had been out of employment and also dispel the delusion propagated by Macaulay that gentlemen in the navy of Charles II were more refined in speech and manners than their rivals, the Puritan seamen. To the latter class belonged Sir William Penn, whom Clarendon found a fluent and formal man, with "many good words, which he used at adventure . . . . and left the matter more intricate and perplexed than he found it." These were the councillors, and though two out of three of them died from wounds received in battle, there were others of more note as fighting men.

Of these the most conspicuous was Sir Christopher Myngs, who died gallantly while serving as Monk's vice-admiral in the Four Days' Fight; he had begun his naval career as Goodsonn's coxswain, and his advancement had been justified by the capture of two Dutch cruisers—though Blake saw fit to rebuke him for risking the State's ship and for the swaggering fashion in which he brought his prizes into port. While serving in the West Indies, Myngs had organized the Jamaica buccaneers for the pillage of Campeche and Santiago de Cuba—exploits which have been unaccountably forgotten. His heroic death was, however, worthily commemorated by Pepys, who knew him as "a very witty, well-spoken fellow" and "a man of great parts, and most excellent tongue among ordinary men." This, taken in connection with the certificate of a Puritan divine that he was of blameless conversation, should make an end of the Macaulayan antithesis regarding gentlemen and seamen. Whether Sir Christopher was a shoemaker's son or not, his talk was not made up of curses and nautical phrases, and he could write a very good letter—though he was unfortunately addicted to piracy. Nor did his immediate successors owe their advancement to methods essentially different from those which governed the early progress of Jervis and Hood in a later century.

Having collected a fleet of formidable proportions, commanded for the most part by men who had served under Cromwell, Charles II prepared to go to war with the Dutch. Though he told a

French ambassador that most of his captains had had the plague and were henceforth immune from infection, he chose Cavaliers to conduct the piratical raids by which the States were provoked to sanction reprisals. Sir Robert Holmes attacked the slave-trading posts of the Dutch West India Company on the African coast; and Colonel Nichols led a fleet to surprise Manhattan—though a dozen standard histories attribute that exploit also to Holmes. A squadron under Allin, sent to the Mediterranean to hold the corsairs of Barbary in check, also took the Dutch Smyrna fleet by surprise before war was declared. Captain Wager commanded a ship on this cruise, and his conduct was contrasted with that of his seniors, Sir Thomas Allin and Sir Jeremy Smith, who had fought on opposite sides during the Civil Wars and were now on the worst possible terms with each other; both had committed ravages on commerce in the Mediterranean during previous cruises; and they were remembered and detested accordingly. Moreover, they were accused of "cowardice and ill-government" by a critic who said that "above all Englishmen that ever were there, there was never any man behaved himself like poor Charles Wager, whom the very Moors do mention with tears sometimes." This praise was not uttered during Wager's lifetime, but Pepys had recorded after a meeting in 1665, "a brave, stout fellow this captain is, and I think very honest." Wager had little opportunity of displaying these rare qualities during the Dutch war, as he died early in 1666, the *annus mirabilis* which saw the Dutch defeated and the city of London devastated by fire and plague.

Though incapable of driving the Dutch out of the Thames or guarding the crippled fleet from the invaders of the Medway in 1667, George Monk, Duke of Albemarle, earned as much credit during the Dutch wars as any of his naval contemporaries in England. He could take a ship into action in gallant fashion, "chewing of tobacco the while"; and even the reluctant Pepys had to admit that he was "a stout man and honest to his country." History has been disposed to admire the military skill and statecraft with which he carried out the Restoration rather than his naval exploits before and after 1660. Yet he had commanded off the Texel when the elder and greater Tromp was slain, and he held his own with De Ruyter in the Four Days' Fight of 1666. Prince Rupert was regarded as a Cavalier rather than an admiral

by many of his comrades, and legend represents him as maneuvering a fleet by military commands. Yet he had cruised for four years with a fleet to which Christendom denied refuge on account of its piracies, and he was doubtless a practical seaman and a navigator—since he had a taste for the applied sciences. Neither Penn nor Montagu gained credit during the first Dutch war of the Restoration; the former died before the next contest began; the latter was blown up in his flagship in 1672, when De Ruyter charged into the midst of the allied fleets at Solebay and sent a reckless captain to grapple the *Royal James* with a fireship. The first Earl of Sandwich deserved a gallant death, but, as Pepys noted with regret, he was too idle and dissipated to administer public business.

The Duke of York, with help from the elder seaman and the ingenious secretary, did something to establish discipline in the navy, but it was found that the captains—or the courtiers—were so regardful of his personal safety that no decisive battle could be fought while he held nominal command afloat. Much of his administrative work consisted in the attempt to revive the Commonwealth traditions conveyed to him by the Parliamentary Articles of War and by memoranda furnished by Penn and Pepys. These traditions have been preserved in all the regulations drawn up in English since 1660, but there has often been a lack of men of Major Bourne's type to make them effective.

In considering the conduct of the Dutch wars, it is natural to speculate as to whether Blake or Goodsonn might not have won more laurels than fell to the lot of Monk and Penn. Goodsonn and a dozen captains of the Cromwellian type are noted as dismissed for non-conformity; and some of them were beset by informers. An attempt was made to entangle Goodsonn in a plot to murder Charles II, although there is no record of any evidence of his complicity; and he must have realized that he would be safer outside of England. Nevertheless, he was still in London in 1664; and Pepys, who met him at a convivial party on board a merchantman, where the rising secretary found that he had outgrown most of the Puritan friends he had once courted, "of whom I am now quite ashamed that ever my education should lead me to such low company," notes an exception in the vice-admiral's favor, finding him one "whom the more I know the more I value for a serious man and staunch." Carlyle used his wonderful

faculty of visualizing a man from the perusal of his letters in Goodsonn's case, and saw him as "a thick, blunt, stout-hearted sailor character, not nearly so stupid as he looks; whose rough piety, sense, stoicism, and general manfulness grow luminous to us at last."

The correspondence upon which this opinion is based relates to the affairs of Jamaica in 1655 and the next two years, when Goodsonn held command of the squadron which Cromwell had sent to contend with the Spaniard for the mastery of the Caribbean, the Gulf of Mexico, and the Bahama Channels. Penn had deserted the expedition after the defeat at Santo Domingo and the seizure of Jamaica; and the death of successive generals and commissioners, including Edward Winslow of the *Mayflower* and Robert Sedgwick of Boston, who had taken the French forts in Nova Scotia in 1654, had imposed an undue share of responsibility on the sturdy vice-admiral. The treasure fleets were missed year after year, though the Tierra Firme galleons actually sighted Penn's fleet while he was steering for Cape San Antonio on his homeward voyage; and the plunder of poor towns along the Spanish Main did not pay for powder and shot. Sedgwick died protesting that there was little hope of strategic results or of founding a colony on a moral basis: "I cannot see God as owning us;" and the people of Massachusetts evaded Cromwell's demand for their emigration to Jamaica, as they had a similar project relating to Old Providence Island, where certain leaders of the Puritans maintained a predatory colony prior to 1641. That station was chosen for predatory ends, in which Goodsonn may have borne a part, since he writes of being at Cartagena in 1634, when that port was closed to all Englishmen unless they came as pirates, smugglers or captives.

While it is obvious that Goodsonn must have gone to sea early in life, nothing is known of his career prior to his first command in the navy of the Commonwealth in 1653. His advancement during the Dutch war was rapid, and he flew the flag of a rear-admiral in the great battles of June and July, 1653; the bullet which killed Tromp was fired from one of the ships of his division in the fight off the Texel. His West Indian service began at Santo Domingo, where the sea-regiment under his command arrested the rout of the army. After his return from Jamaica in 1657 he assisted in the blockade of Dunkirk, and supported the

troops that stormed its forts and made it an English possession. His command lasted until the eve of the Restoration; but he then dropped into obscurity, and was content to be known as a "merchant of Wapping." It was so with his comrades of the New Model, the army which had dominated the three kingdoms both in a military and political sense for a dozen years. Few of them joined plots against the restored monarchy, and none of them became beggars; most returned to their trades: "this captain a shoemaker, the lieutenant a baker, . . . the common soldier a porter, ... and every man in his apron and frock . . . . as if they had never done anything else." Such conduct had its reward in worldly prosperity, and it was in sharp contrast to the swaggering of the Cavaliers. The seamen were less obviously Puritanical, and the fact that they had a chance to serve under their old officers in many ships helped to keep them contented as long as their wages were paid. Gossipping letters to New England reported, however, that they objected to the Cavalier chaplains who mingled curses with their invitations to prayers. While there may have been some chaff at the expense of such chaplains as Teonge, whose diary records the custom of ending the week "with drinking to our wives in punch bowls," or that other with whom Pepys did not like to be seen on account of his red nose, "though otherwise a good-natured man," doubtless the shorter sermons made up for such drawbacks.

The former vice-admiral's daughter was married in 1663 to Captain Wager, who died three years later, shortly before the birth of his son, the future Lord of the Admiralty. As the widow married again—one of her grandsons was the Admiral Watson who assisted Clive in the conquest of India—the boy may have been left under Goodsonn's control. At any rate they seem to have emigrated to Rhode Island during his youth, and he was apprenticed to Captain Joseph Hull, a Quaker mariner who dwelt on Conanicut Island and traded to London in his own ship. Tradition has it that Goodsonn was buried on that island at an unknown date—which must have been after 1680—and the records of Newport show persons of his name intermarrying with the older families during the next generation. The papers of the Hulls and Goodsonns were lost when the British burned houses on Conanicut in 1775; but the tradition concerning the Puritan admiral is entitled to our respect.

The younger Wager's connection with America rests upon documentary evidence to some extent, though its picturesque features are preserved in legends. Selecting the more credible variant, we find the young man serving as mate of Captain Hull's ship in 1689, when the coming of William of Orange was followed by a war with France. In the English Channel the New England ship encountered a formidable French privateer; a Quaker captain could not fight, even in defense of his own ship—a peculiarity which led the West India planters to urge that Friends ought to be excluded from command; but the mate ordered Hull below and cleared for action. Nevertheless, the captain watched the progress of the fight with a seaman's eye, with his head above the hatches; and when he saw the Frenchman standing across the bows, doubtless with the intention of raking the deck before boarding, he called to his mate, "Charles, if thee wishes to run that vessel down, thee had better starboard a little." Starboard it was; the vessels crashed together; and the swarming crew of the corsair were soon struggling in the sea, where all of them perished. Upon arriving in an English port, Hull was congratulated upon his success in disposing of an enemy notorious for mischievous activity; and it is said that he was offered a naval command. Moved by a sense of justice—and grieving, perhaps, over the inhuman aspect of the exploit—the captain gave all the credit to his mate, and left him free to accept the reward.

The name of Charles Wager appeared in the navy list of 1690 as second lieutenant of a frigate, and thenceforth his advancement was rapid. In 1691 he married Martha, daughter of Captain Earning of the Commonwealth's navy and niece of Nehemiah Bourne, the late navy commissioner, who had left her a legacy a few months before the wedding. Wager took part in the battle off Cape Barfleur in 1692, when Russell formed the English and Dutch ships in line and shattered the fleet of Louis XIV. James II witnessed the fight from the cliffs, and his disappointment at the failure of those whom he counted as his partisans to change sides during the action—the situation is reflected in Cooper's tale of "The Two Admirals," which Señor Montojo, who commanded in Manila Bay in April, 1898, translated into Spanish—could not cover his admiration for the navy which he had once controlled: "They follow my tactics," he said, "have they Pepys on board?"—a query which suggests a doubt as to the originality

of his tactical views. Wager got a command in time to convoy a fleet of merchantmen to New England in 1693; and he had a period of repose with his family about 1700. The next three or four years were spent in cruising in the Mediterranean under the command of the elder Byng and Sir Clowdisley Shovell; but Wager had found other employment before the fatal day in October, 1707, when Shovell led his squadron among the reefs of the Scilly Islands and perished with the crew of his flagship, who are said to have "got drunk for joy that they were within sight of land"; and three or four other ships were wrecked in this disaster.

Captain Wager was commissioned in 1707 to command the squadron in the West Indies, with authority to hoist a broad pennant and appoint a captain for his flagship as soon as he got clear of the Channel. Shortly after arriving at Jamaica, he heard that the French Admiral Ducasse was coming out with a convoy for the Spanish treasure fleet, and he made haste to anticipate his appearance. The accession of a grandson of Louis XIV to the throne of Spain had brought about the transformation of the buccaneers into the character of protectors of the commerce upon which they had so long depredated. Ducasse, who had led them in raids on the Spanish part of Santo Domingo and in carrying off 3000 negroes from the English plantations in Jamaica, had also rallied them for their grandest filibustering achievement, the double pillage of Cartagena in 1697. The defeat of Benbow's squadron in 1702 had earned him the title of lieutenant-general in the French Navy; and the rescue of the treasure fleets was followed by his advancement to similar rank in that of Spain and to his admission to the order of the Golden Fleece. Yet he was still followed by the most notorious of the buccaneers, by Captain Laurent De Graff, the "Lorencillo" who had sacked Vera Cruz in 1683, and others of that clan. Had Wager encountered the French contingent, his success might have been less brilliant, as his captains were hardly more brave or loyal than those who had deserted Benbow.

Wager was fortunate in having to deal only with Spanish galleons when he encountered the Tierra Firme fleet between Porto Bello and Cartagena, on May 28, 1708. Seventeen ships were sighted, of which three bore admirals' flags and were heavily armed. Only three English ships were at hand; and Wager's

flagship, the *Expedition* of 70 guns, had to bear the brunt of the fight. Closing with the Spanish admiral at sunset, Wager plied his broadsides until his antagonist blew up, flooding the decks of the *Expedition* and disabling some of her crew with missiles from the explosion. Damages were repaired and sail was made to enable the commodore to close with another Spaniard; and after fighting from ten o'clock until two in the morning, the rear-admiral called for quarter. Wager's own ship was unable to make sail to pursue the third galleon, though its vice-admiral's flag was still in sight at dawn. Neither signals nor verbal orders could induce the captains of the *Expedition's* consorts to "chase to windward," and the rest of the Spaniards escaped. A court-martial found the culprits slack in their duty and negligent in pursuit, and they were dismissed from the King's service. Had they been convicted of cowardice, they would doubtless have shared the fate of the two captains who were shot to death in 1702 for deserting Benbow in battle.

Wager's victory had been less complete than his conduct had deserved; and much less than a third of the $48,000,000 carried by the galleons was captured. His prize is said to have yielded only "thirteen chests of pieces of eight and fourteen sows of silver"; but the proceeds made him a very rich man. Other prizes increased his wealth; and a rear-admiral's commission and a patent of knighthood were received in due course. Battles were appraised according to financial results in that age; and Wager was quite as much of a hero as Sir George Rooke, whose attack on the galleons and their French guards at Vigo in 1702 had deprived the Bourbons of $13,000,000. Had Wager been provided with ships enough to cruise off Havana in 1708, he might have baffled Ducasse and intercepted the fifty millions that dexterous seaman was able to land in Spain before the summer was over. Ducasse richly earned the rewards bestowed by both the Bourbon kings, since but for his dexterity, the funds necessary for maintaining the war of the Spanish Succession might have been intercepted. The commodore won popularity among the seamen by renouncing certain perquisites claimed by other flag officers, and by dividing all prize goods strictly according to law.

Wager became one of the Commissioners of the Admiralty in 1718, and the higher post of First Lord was attained fifteen years later. When a new war broke out in 1726, he hoisted his flag as

Vice-Admiral of the Red, and cruised in the Baltic and in the Strait of Gibraltar during the next two years. His ships helped to save Gibraltar from the Spanish attack, but he was unable to prevent the West Indian treasure fleet from slipping into the Bay of Cadiz in 1727. This disappointment caused him to write to a friend that, being now past sixty, "it was time for him to be in his garden at Parson's Green." Yet his experience was far more fortunate than that of Admiral Hosier, who was sent to blockade the ports of the Isthmus and lost his own life along with eight captains, fifty lieutenants, and four thousand men—nearly the whole complement of his fleet—in two wasted years of West Indian cruising. After the peace, Wager took part in a ceremonial cruise to Leghorn to pay honor to a new Italian kingdom; but as the Bourbon prince who was to be crowned chose to travel by land, while the French fleet was withdrawn to avoid saluting the English admiral as the senior officer present, the occasion was less splendid than had been anticipated.

The war in which Walpole was forced to engage the nation on account of the clamor over the story of how Captain Jenkins lost his ear showed that the Admiralty had become disorganized by corruption; and Wager was too old by 1739 to set about its reformation. Vernon was one of the critical faction, and he was allowed to sail to carry out the promise he had made in a Parliamentary speech of capturing Porto Bello with six ships of the line. His success at the Isthmus in November, 1739, compelled the Admiralty to appoint him to command the fleet which failed to take Cartagena two years later, and which was equally helpless off Santiago de Cuba, though Guantánamo was in the hands of the English for three months. These failures were largely due to the lack of co-operation between naval and military commanders—a defect which modern conditions have not completely cured; but Vernon has to be counted among the refractory admirals, with whom no administration can be patient—though his dismissal from the service in 1745 may have been an act of injustice.

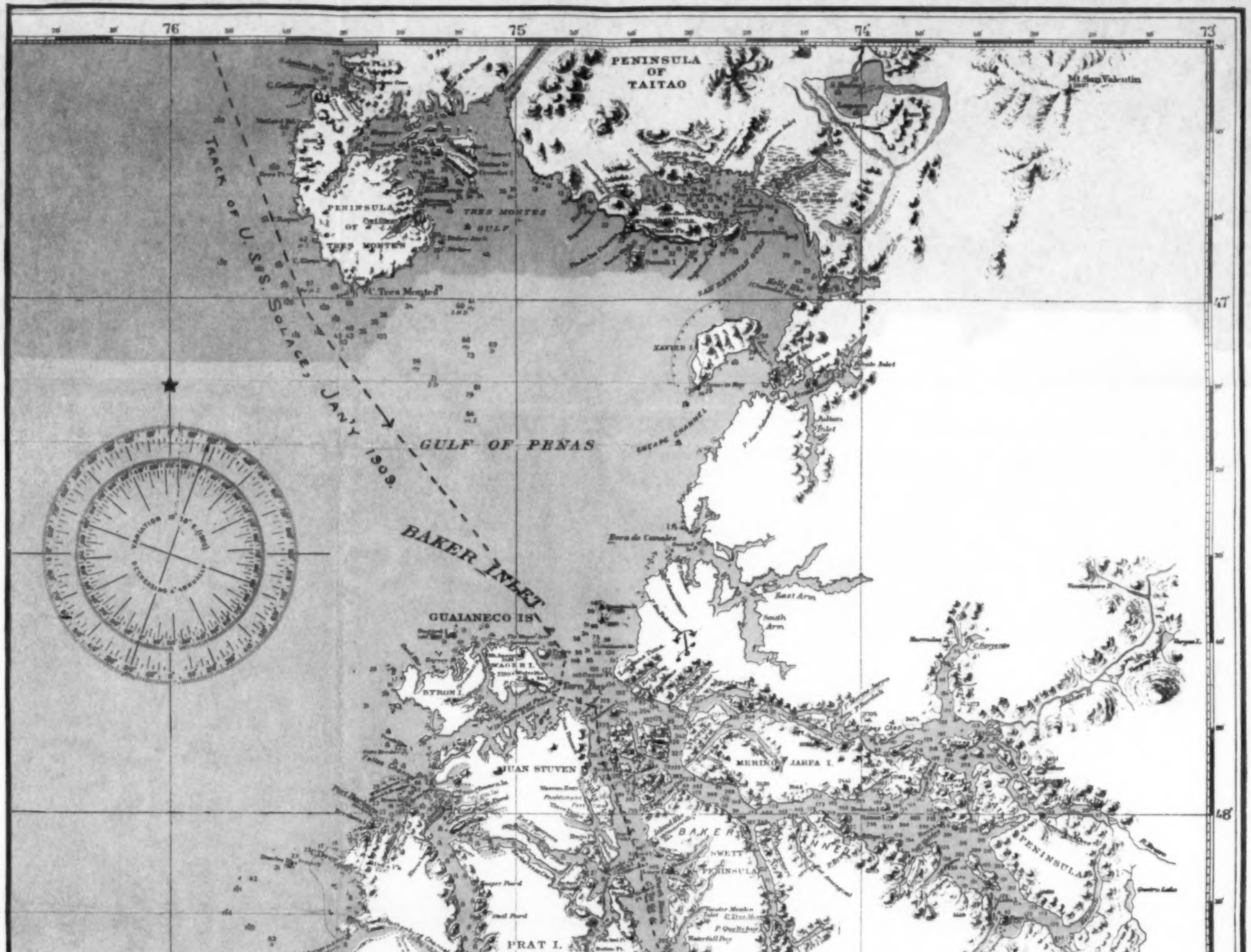
Wager was out of office before that event, having resigned in 1742 on account of age and ill-health; but the series of controversies with which the Admiralty had to deal may have shortened his days. Yet he had seemed much at home at the Board in 1729, and had been noted for "dexterity and despatch in business."

An admirer wrote to Wager's former patron in Rhode Island that he had seen Sir Charles write a score of letters at a sitting with less strain than an ordinary administrator could write two: "One would conceive he had been bred a Secretary of State." Wager did not forget that he had served another apprenticeship, and he found means to testify his gratitude to the Quaker who had been, as he told an officer who objected to the forms of "plain speech" when applied to an admiral, his master in all that pertained to the sea. Until the death of Captain Joseph Hull, in 1732, a pipe of Madeira—no less than 126 gallons of generous wine—was delivered at Conanicut Island every year, captains in the navy and masters of merchantmen manifesting their zeal in executing the commands of a Commissioner of the Admiralty. From the letters of these agents most of the evidence of Wager's American connection is derived. His portrait is said to have been in the hands of a member of the Hull family in Newport less than 100 years ago. The burning of houses at the north end of Conanicut during the war of the Revolution may have deprived us of the story of the early part of Wager's apprenticeship as well as of definite information concerning the latter days of his illustrious grandfather.

Wherever the banished Puritan, Vice-Admiral Goodsonn, may have found a grave, Sir Charles Wager has a monument in Westminster Abbey, "on the base of which is represented in sculpture the attack, capture, and destruction of the Spanish galleons in 1708." There is also an imposing epitaph, a well-balanced catalogue of merits like that for which Lowell's ancestor substituted, after a computation of the stone-cutter's charges, the cheaper compendium, "Possessed of every virtue under Heaven." The eighteenth century had a florid taste in inscriptions; but it is worth noting that this Admiral of the White was, "in his private life, humane, temperate, just, and bountiful. In public stations, valiant, prudent, wise, and honest . . . . so remarkably happy in his presence of mind that no danger discomposed him." So much can be confirmed from the annals of the four reigns during which he served England; and some part of his honorable repute must be credited to the Puritans from whom he was descended and to the Quakers among whom he dwelt in America and began his apprenticeship to the sea.

Sir Charles left no issue to inherit the wealth and honors he had

gained in his fifty years' service in the navy, and the attempt to commemorate him by giving his name to a sloop-of-war proved most unfortunate. The *Wager* sailed with Anson for the Pacific in 1740 and came to grief in the Chilean Archipelago within a year. The tragedy of her shipwreck can hardly be matched in sea-faring annals. Discipline was shattered as soon as the ship struck, and the captain was marooned on a desert island, whence only three or four of his party escaped. The mutineers had little better fortune, though there was no law for punishing their desertion. As First Lord of the Admiralty, Wager had planned to send Anson's squadron direct to Manila, but the plan was changed by the Cabinet, and the ships sailed in wretched condition. Wager did not survive to meet Anson after the bringing home of the spoil of the galleon from Mexico to the Philippines, which amounted to $2,500,000. The remnant of the *Wager's* company which returned with her captain did not reach England until nearly three years after the death of the admiral whose name her miserable story has helped to perpetuate.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75
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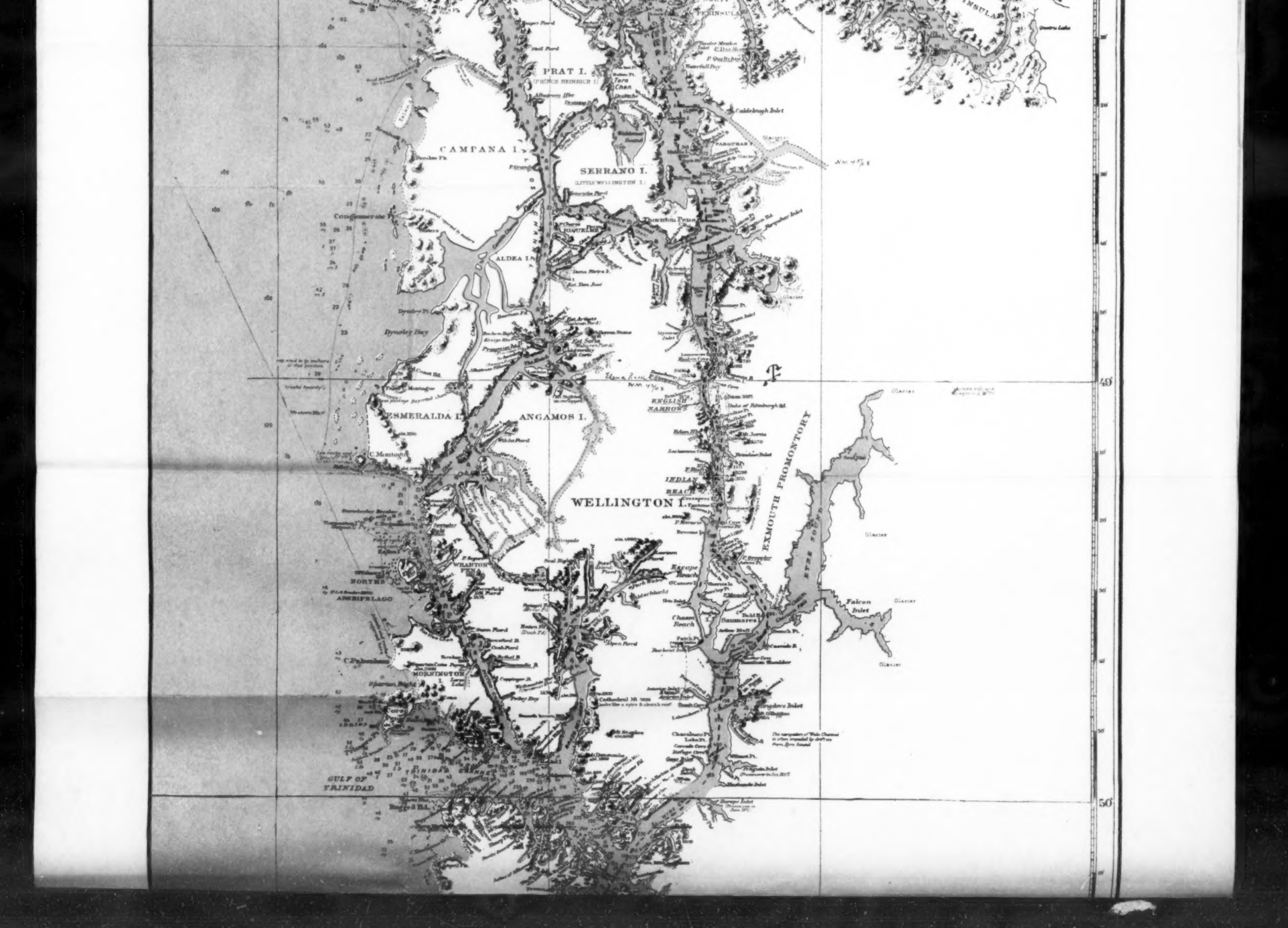
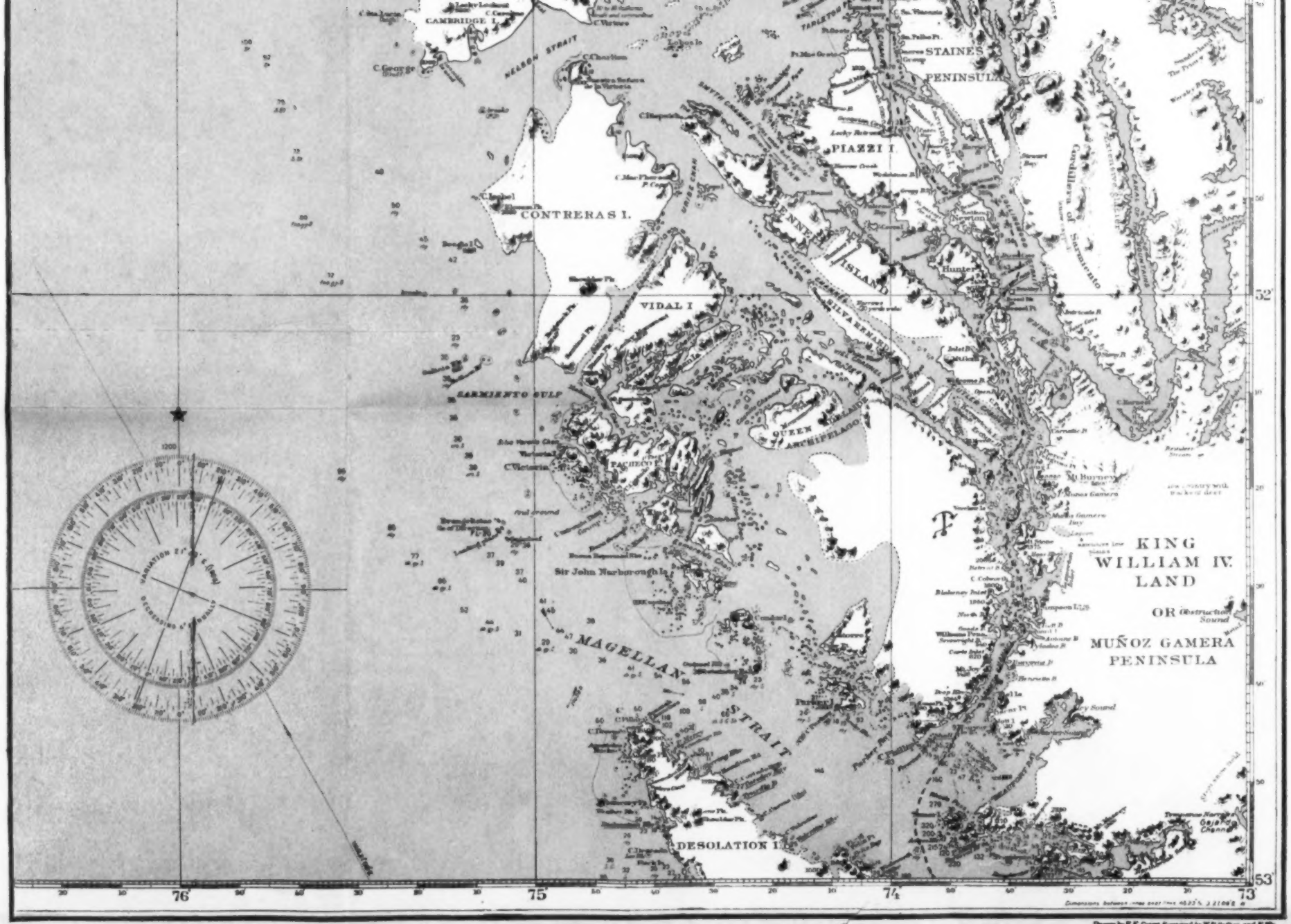
PENINSULA OF TAITAO
Mt. San Valentin
PENINSULA OF TRES MONTES
TRES MONTES & GULF
C. Tres Montes
TRACK OF U. S. S. SOLACE, JAN'Y 1909.
GULF OF PENAS
XAVIER I.
CREAC CHANNEL
Boca de Comodoro
East Arm
South Arm
GUAIANECO IS.
BYRON I.
JUAN STUVEN
MERINO JARPA I.
BAKER
INNER
PENINSULA
PRAT I.
VARIATION 0° 30' E. (1909)
DECREASING ANNUALLY


PRAT I.
PRINCE HEINRICH I.
CAMPANA I.
SERRANO I.
LITTLE WELLINGTON I.
ALDEA I.
Dyneley Bay
ESMERALDA I.
ANGAMOS I.
WELLINGTON I.
ENGLISH NARROWS
INDIAN REACH
EXMOUTH PROMOTORY
EYRE SOUND
Falcon Inlet
Glacier
NORTHS ARCHIPELAGO
MORNINGTON
GULF OF TRINIDAD
TRINIDAD CHANNEL
Taro Chan
Tara Chan
Dyneley Pt.
C. Montagu
Cathedral Mt.
Summaries
Chasm Reach
Eyre Sound
49
50

GULF OF TRINIDAD
MADRE IS.
WEST CHANNEL
DUKE OF YORK I.
CHATHAM I.
CONCEPCION STREET
HANOVER ISLAND
Ellen Bay
CAMBRIDGE I.
NELSON STRAIT
STAINES
PENINSULA
50'
51'



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AT THE HYDROGRAPHIC OFFICE.
H.M. Hodges, Captain, U.S.N. Chief Hydrographer.

Drawn by R.E. Court. Engraved by W.P. Irvin and F.W.

Track of U. S. S. Solace, Jan. 1909, from the Gulf of Peñas to Magellan Strait

No. 2243

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THROUGH THE PATAGONIAN CHANNELS AND THE STRAIT OF MAGELLAN.

BEING A BRIEF ACCOUNT OF THE VOYAGE OF THE U. S. S. *SOLACE* VIA THESE INLAND WATERS IN THE MONTH OF JANUARY, 1909.

By LIEUT.-COMMANDER RAYMOND STONE, Executive-Navigator.

Sketches after originals by COMMANDER ELLICOTT; photographs by HOSPITAL STEWARD CHARLES H. GRAU; both used by permission.

Under orders from the Navy Department to proceed to Charleston, S. C., the *Solace*, Commander John M. Ellicott, U. S. N., left Magdalena Bay, Lower California, Mexico, on the second day of December, 1908, touching at Pichilinque Harbor, Panama, Callao, and Talcahuano.

That part of the voyage around to the Atlantic Coast, which involves the deep sea passages in both oceans, being of common occurrence, probably contains no features of especial interest; but I believe that a brief account of our experiences from Talcahuano to Punta Arenas (Sandy Point), Chile, may prove of some interest, both general and professional, to the readers of the PROCEEDINGS OF THE INSTITUTE. Certain it is that all our efforts to glean some knowledge of the inland passage from books and from people, from sailing directions and from officers, developed the fact that reliable information on the subject was exceedingly difficult to obtain.

Only two officers in the ship had ever been through the Patagonian Channels; they had made the northbound passage in the Atlantic Torpedo Flotilla last year, but under circumstances that had enabled them to retain few points of navigational value to us, so that, in effect, our voyage was one into the unknown. Still our charts were as good as any extant, though necessarily not exact in all particulars because the hydrographic survey of these regions is incomplete, and on them we had to rely.

Before our departure from Talcahuano several persons, among them officers of our navy, with whom we discussed the proposed run were rather discouraging and pessimistic as to attempting it with a single screw ship of the *Solace's* length (377 feet), with especial doubt expressed as to her ability to negotiate the English Narrows in Messier Channel. However, after a close scrutiny of the chart and careful consideration of all related matters, Captain Ellicott decided that it would be entirely feasible to pass the Narrows with care and judgment *and nerve*. I must confess that from a study of the chart alone, my own leaning was to enter the channels by way of the Gulf and Strait of Trinidad, thus avoiding the Narrows; but in the light of subsequent events and more extended knowledge gained from consultation with ship captains met *en route*, the advisability of entering at the Gulf of Peñas is now firmly established in my mind. One captain with whom I talked told me that while he had often gone *out* of the channels (when north bound) by the Trinidad route, he had never gone *in* that way for the very simple reason that if the weather were fine and clear at sea when in the neighborhood of the Gulf of Trinidad it was better to carry on to the western entrance of Magellan Strait proper, and if the reverse were true Trinidad entrance, the home of fogs and currents, unmarked by any artificial aids to navigation, could be found only with difficulty and danger and risk; other "holes in the wall" might easily be mistaken for it. We never had occasion to regret the decision to begin at the Gulf of Peñas; and more than once during the days of storm that followed did we give thanks that we were in the smooth interior waters instead of being out on the rough ocean to the northward of Cape Pillar; for, between the fifteenth and the twenty-second of January, there occurred in the region between Galera Point and Cape Pillar, three separate and distinct gales; the first of these we weathered in the open ocean off the Chilean coast to the northward of the Gulf of Peñas; during the other two we were at anchor in the Patagonian Channels.

Leaving Talcahuano in the early morning of January 15, and adjusting compasses in Concepcion Bay, we cleared Quiriquina Island and took departure about 9.00 a. m. Strong head winds and rough seas were encountered almost at once and continued for a day; on the next day the wind was light and the sea smooth, enabling us to make good progress throughout that day and the

following night. But about four o'clock in the morning of the 17th, Sunday, the barometer started down and the wind came out from the northwestward, increasing rapidly in strength and driving in rain and mist. Just at daylight a fortunate sight of Guafo Island light—the last light on this coast until you reach the Evangelistas, some 500 miles away to the southward—enabled us to fix position before the storm and thick weather set in for a full due; no astronomical observations had been practicable for hours prior to this time nor were for many hours thereafter. By 4.30 p. m. the barometer had fallen to 29.39 inches and the beam sea had become so heavy, causing excessive rolling (from 25° to 47°), that the ship was brought to with the sea sharp on the starboard bow and lay so, steaming ahead only enough to give steerage way, until midnight of the 17th-18th, when she was again put upon her course. Starsights taken near midnight, gave an approximate position (considerably different from the position by account—there are currents) from which to shape a course for Cape Tres Montes, the northern cape of the Gulf of Peñas. In due time this headland was sighted about on the expected bearing. Upon coming up with it the northwest wind and following sea were increasing, and the weather getting thicker and mistier; it was then two o'clock in the afternoon, with a prospective run of sixty miles across the Gulf of Peñas to an only anchorage, restricted and precarious looking on the chart and never before seen by any of us. The temptation was great to run in to Port Barroso under the lee of Tres Montes and there to await the morrow; still, not knowing what the morrow might bring forth, and having the alternative of turning back into the gulf should we not find our anchorage, we stood on at 13 knots, and when night fell were hanging on to a ledge called Port Ballenas on the southern side of Wager Island, with the port bower in 12 fathoms of water and a kedge over the stern in 30 fathoms. Here we spent a comparatively quiet and comfortable night. With the strong northwest wind and rough sea following us we had fully expected to find a jumble of confused and perhaps troublesome seas banked up in Tarn Bay at the bottom of the Gulf; but much to our agreeable surprise the sea smoothed down as the lee shore was approached, although the wind continued very fresh. Port Ballenas was dead smooth.

At 9.00 a. m., of Tuesday the 19th, we left Port Ballenas, in-

tending to run as far as Eden Harbor, 82 miles away and 10 miles beyond English Narrows, planning to pass through the Narrows at slack water calculated for 4.30 p. m.

Tentative plans for daily runs between anchorages had been made well in advance of this stage of the voyage; and though they were not followed exactly, they formed excellent bases for the modified plans that were subsequently adopted and carried out. In running through the channels it is necessary to anchor at night, and at least for big ships the anchorages are few indeed, so that it behooves one to attempt no greater run than he can surely make and to reach his anchorage well before dark. If he misses it he will have an anxious, if not disastrous night.

Well clear of Port Ballenas, leaving the lofty well-named Sombrero Island on the port hand, heading directly for what appeared to be a blank wall, catching an occasional glimpse of the headlands through or under misty rainsqualls, trusting to chart and compass, we dived into the unknown wonderland. After about an hour's run inside of the channel the gulf mists disappeared; but the rainsqualls, sometimes very thick, continued at frequent intervals. However, in this region the runs are fairly straight for long enough periods to lay a compass course to carry through the duration of an ordinary squall.

The scenery at the northern entrance of Messier Channel from Tarn Bay is perhaps more impressive than that farther along when one has, so to say, become used to it; it is truly wonderful. Numerous and beautiful cascades catch the eye all along this part of the route, foaming down the mountain sides like streams of silver, some dashing over precipices to the water below in full sight, others losing themselves in underbrush and ravines and disappearing from view before their end is reached. Supplied by frequent rains and melting snows they are apparently neverfailing; many are visible throughout their entire course, from peak to base of mountain.

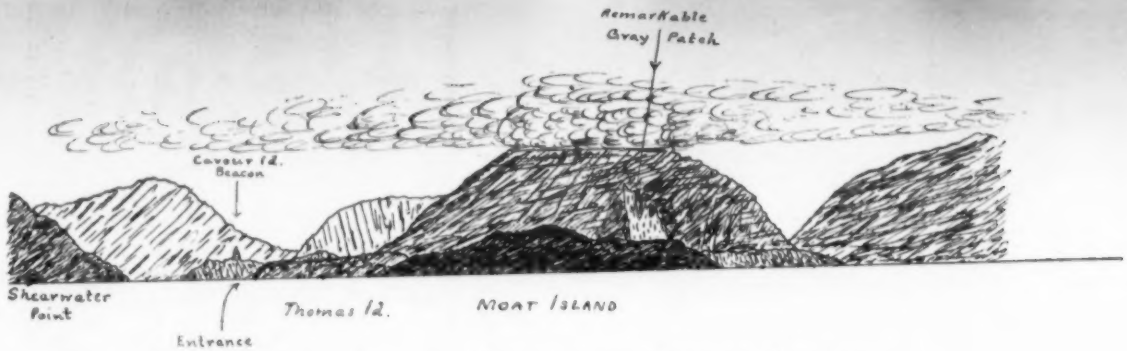
Running along through Messier Channel, passing successively Cock's Head, Hen's Head, and other prominent and well-defined salients, we came, about 4.30 p. m., through a very narrow opening, in width scarce twice the ship's length, into Solferino Bay, a small pocket at the northern end of the English Narrows; here we anchored in 30 fathoms depth of water in order to observe the action of the current through the Narrows and to await a combi-

"The Lofty, Well-named Sombrero Island."

Northern Entrance into Messier Channel. The First Dive into the Unknown.

A Straight Course—for a Minute.

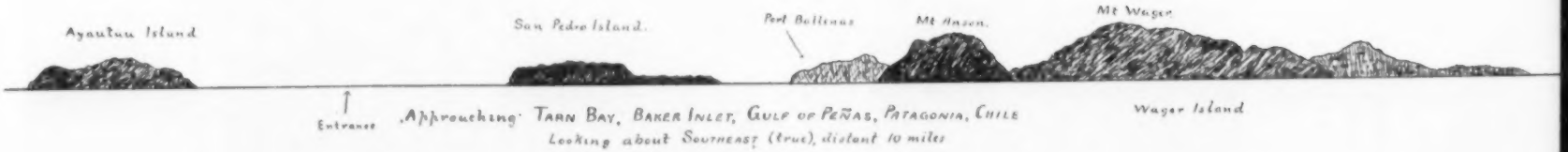
English Narrows. Mid-Channel Island. Caution Shoal Buoy in Middle Ground (Right).



CHILE. PATAGONIAN CHANNELS. MESSIER CHANNEL.

Approaching ENGLISH NARROWS from N'd.

Distance 8 miles.



Approaching TARN BAY, BAKER INLET, GULF OF PEÑAS, PATAGONIA, CHILE

Looking about SOUTHEAST (true), distant 10 miles

nation of slack water and clear weather; for one must see in order to navigate in this locality. We lay thus very comfortably in a sort of slack pool or eddy just outside the line of the direct tidal currents and so avoiding their strength, which is about six knots at the season of the full moon. Caution Shoal buoy near at hand, right in the path of the tidal stream, was, at its strength drawn completely under water. At this anchorage, as at nearly all others in the straits, the bottom is rocky and uneven, which causes the chain in dragging over it to surge and jerk, jarring the entire body of the ship as if she had touched on some projection from the bottom. Until one becomes accustomed to this shock and has fully investigated and explained the matter in his own mind, the effect is somewhat disconcerting.

To one familiar with historical names and dates, the years of the survey and the nationality of the surveyors may almost be determined by the names hereabouts—Solferino, Magenta, Cavour; and a little farther along Collingwood, Farquhar, Tarleton and Victory.

At Solferino Bay anchorage we remained for two nights and the intervening day, while the second gale raged roundabout. In this landlocked space, walled in by high mountains, the outward and visible signs of the storm were the behavior of the barometer, and the frequent and furious squalls of wind, rain, and mist coming down the mountain sides in wullie-waws cold and shivery from contact with the snow blankets of the peaks; for although it was the season of midsummer, the summits were entirely covered with the soft white mantle and the ravines and valleys filled with ice and snow perpetually untouched by the rays of the sun.

Between squalls some of the more hardy and venturesome ones among us manned a boat and landed on a small islet near our anchorage. In its rankness and luxuriance the vegetation in this locality is quite tropical, though in other respects entirely dissimilar as would naturally be expected by reason of the latitude. Of actual earth or soil above the rocky foundation there seems to be little or none; but instead, a treacherous yielding mattress of tangled underbrush, leaves, twigs, and moss, which furnishes very uncertain and insecure footing. One of the party, venturing inland from tide mark in search of a (theoretically) killed bird, struck a soft spot and all but disappeared from view through the

"Solace" at English Narrows. Waiting for a Favorable Chance to go Through.

The "S" Turn at English Narrows.

After Clearing English Narrows. Looking to the Southward Toward Indian Reach.

Patagonian Canoe.

carpet, cheerfully singing out as he sank, "no bottom at ten!" With some assistance from the others near at hand he was finally extricated not much the worse for wear; likewise without the bird which in the excitement had taken wing and flown elsewhere. After gathering specimens of plants and flowers and orchids—these last grow in great profusion and are beautiful—another opined, "Nature must surely have been a trifle mixed when she arranged matters in this neighborhood; lilies of the valley grow on huckleberry bushes, huckleberries grow on holly bushes, holly bushes bear red flowers, all bushes bear orchids, and ducks swim with their wings," the final remark in exclamation at the sight of "paddle-wheel" duck scuttering across the channel.

Nature may have been mixed, as charged; but she, nevertheless, managed to evolve some grand scenery hereabouts which the accompanying photographs, excellent though they are, only imperfectly portray. I earnestly wish that I possessed the ability to describe our surroundings at this place and elsewhere along the route while underway, and faithfully, adequately, to depict the features of interest and grandeur, ever changing, ever bringing into view new and unexpected beauties like an immense kaleidoscope. For even to one engrossed in the exactions of the navigation and conduct of the ship along her intricate course scenic beauty was on every side; to the untrammeled observer there must have been wonderful sights to behold.

During the night of the 20th the gale passed by or blew itself out, the barometer took an upward trend, the skies cleared partly —they never clear wholly—and at good daylight, 4.30 a. m., of the 21st, with current slack and seeing good, we passed at full speed through the problematical English Narrows without difficulty or mishap of any kind, thanks to the excellent handling by our captain of a would-be unwieldy ship. In and just beyond the Narrows the navigation requires the greatest vigilance, involving the avoidance of Caution, Zealous, Mindful, and Lookout shoals, whose very names are indicative of their dangerous importance to the mariner. Ten miles farther on is Eden Harbor, one of the very few anchorages of size and reasonable depth in the entire length of the channels; it has room to berth about four ships of battleship or armored cruiser class; it is the waiting place for northbound vessels drawing near the Narrows at an unfavorable stage of the tidal current or when nightfall approaches. At the edge of the northern en-

trance to the harbor lies the wreck of a steamer, starboard bow high in air, stern fathoms under water, masts nearly horizontal; mutely telling the simple sad story of the Patagonian Channels; trying for a haven in mist, or snow, or fast-falling night, treacherous current, an uncharted pinnacle rock, destruction.

The stretch of water next beyond Eden Harbor is known by the name of Indian Reach, the shores in this vicinity having been formerly peopled by Indians, though nowadays they are only occasionally seen, being of wandering disposition and carrying their canoe homes with them from place to place. Port Rio Frio, a fair anchorage, opens into the Reach, whence it is easily accessible.

On through Grappler and Icy Reaches and Wide Channel our course lay. In Icy Reach two Indian canoes came out from shore to intercept us. On our approaching them at full speed, their gesticulations and shouts became wilder and louder; and when it appeared that we were going to pass them by without contribution, one big fellow in the first canoe stood up in evident rage and hurled a wooden spear straight at the ship's side. It fell short; and at that moment a tin of hardtack hove over from our bridge claimed his attention, exempting us from further spear fire. These canoes are poor affairs, without an atom of naval architecture discernible in their construction; each is simply a box made of pieces of wood lashed together and caulked with moss. And yet they seem to serve their owners satisfactorily as both home and conveyance. These two each contained several adults, two or three children, and three dogs. The dogs being alive we formed the opinion that the humans were not suffering from the lack of food. Our sympathies, doubtless entirely wasted, went out to the half-clothed natives, especially the children; but they, only partly covered by an animal skin or an old garment, were apparently altogether comfortable despite the fact that the thermometer was registering 45° F. and that we on the bridge of the *Solace* were none too warm though wearing flannels and overcoats.

One writer thus describes the Patagonian Indian: "Naked in his frail bark canoe, braving the perils of the sea; the man crouches in the bow, on the outlook for prey. The women (usually two) paddle the canoe from the stern. Along the shore run one or two dogs to sniff out and turn any lurking otter or seabird. The only household goods . . . . are smouldering fire-brands which he carries on a slab of shingled turf in his canoe to each fresh halting

place. He owns no faith, religion, or tribal tie other that that of the family which huddles together for food and sustenance. Should the canoe be overtaken by a storm he will, very sensibly, throw his wife and children overboard if it is necessary to lighten the craft." But he will treasure the dogs. In time of famine old women are strangled, while dogs are kept alive, for "Doggie catch otter, old woman no!"

In Wide Channel we found clear blue sky and bright sunshine for almost the first time since entering the interior waters; the air was brisk and invigorating, and even the rainsqualls seemed to be not *very* wet. But, nearing the junction of Wide Channel and Trinidad Strait, where one may catch the first glimpse of the Pacific since leaving the Gulf of Peñas, the ocean mists and fierce thick rainsqualls came down upon us, some of them lasting for ten or fifteen minutes at a time and blotting out the whole landscape, but rarely long enough to necessitate our slowing down; near here also opens out Chasm Reach, the alternative channel around Saumarez Island, "the straight and narrow way," where a big ship has not room to turn around. It is said to be overwhelmingly grand. We did not attempt it, Icy Reach and Wide Channel being much nearer our size.

In this vicinity we found the scenic effects noticeably different from those theretofore observed. I suppose the difference is due principally to the greater width of the channels, the comparative openness of the waters and of the heavens, admitting more play of light and shade; though the physical characteristics of the land itself are diverse from those farther to the northward. There is less of snow on the mountain tops and fewer cascades than in Messier Channel where they form one of the most attractive features of the landscape. Away to the westward, forming a great barrier against old ocean, lie the wild and rugged islands that are as yet almost unexplored and unsurveyed. Even in the distance their appearance is most rough and forbidding, with peaks and pinnacles so sharp and jagged that one wonders that they are not continually breaking off and falling into the sea thundering at their feet; and perhaps they are.

Leaving behind this region of comparatively open water, passing by the Island of the Innocents, we shortly came to Guia Narrows, which at its mouth is really narrow (about 250 yards), the most restricted pass along the entire route; and were it not for

the almost straight course through, in difficulty it would be in the same class as the English Narrows. As it is the current is strong, but sets directly with the channel, thus minimizing the difficulty. Just beyond the Narrows is Unfit Bay, an attractive looking retreat, but bottomless and full of pinnacles. What depth of meaning in the name itself! One can easily imagine the feelings of the mariner who, seeking there a night's refuge, found only disappointment and gave expression to his feelings in the name bestowed upon this false haven.

We passed Unfit Bay about three o'clock of the afternoon; a little distance beyond comes Cocked Hat Island, as aptly named as Sombrero itself and looking for all the world like a navy chapeau, vintage of 1850.

For several hours the barometer had been foretelling trouble to come, the rain and sleet squalls were becoming more frequent and the wind freshening rapidly; but, steaming before it, we did not realize its whole strength until rounding up to an anchorage in Puerto Bueno. Then it struck us full in the face with such force that great difficulty was found in bringing the ship on a fair heading for the harbor mouth, which is so narrow that it must be approached exactly on a bearing, with no room to spare on either side of the course. Just as the ship's head crossed into the port entrance a squall more furious than all preceding caught her on the bow and she refused to round to; with rocks all around, no room to spare ahead or astern or to leeward and precious little to windward, we were forced to let go anchor before coming head to wind. Caught thus, broadside on to the blast, the chain tautened like a bar and she seemed almost certain to drag. It can easily be understood that the next few minutes were anxious ones indeed; for the chart shows a bottom of pebbles and shells—poor holding ground—and with the rocky shore a scant ship's length under our lee, the chances seemed decidedly against the ship's straightening out to her chain in time to avoid the lee shore. Fortunately, however, everything held and we were soon able to breathe freely; in a subsequent lull we shifted anchorage dead to windward, let go both anchors, and got a kedge over the stern to keep from swinging foul of the nearest danger, a reef abeam and close aboard. When eventually the anchors were weighed, they came up with stiff blue clay—our salvation.

At Puerto Bueno we remained two nights and the intervening

WIDE CHANNEL. LAST NIGHT'S SNOWFALL. MIDSUMMER.

"AWAY TO THE WESTWARD.... LIE THE WILD AND RUGGED ISLANDS...."

Approaching Guia Narrows.

Pound's Island, Behind which is Puerto Bueno.

day while the third gale of this voyage ran its course with the usual accompaniments of squall, wind, rain, hail, and a flurry or two of snow. The barometer went down to 29.28 inches, a level that would cause the North Atlantic voyager to "fear the worst." But, after the first few squalls had tested out our ground tackle and holding ground, we felt right snug and secure; for although this anchorage is on the lee side of the channel, exposed to the prevailing winds and unprotected by any immediately adjacent high land, still there is no sea whatever, no surging on the chain.

It is a favorite anchorage for vessels bound through the channels, many of whom have left monuments in the way of sign boards bearing the ship's name with the date of her visit; some of them date back many years; and some ships, instead of erecting sign boards, have painted names and dates directly on the rocks. Our carpenters and painters got busy, and between squalls a volunteer party manned a life boat, landed on Paynter Island and posted conspicuously a sign board some 3′ x 6′ on which was inscribed:

U. S. S. *SOLACE.*
Commander J. M. Ellicott, U. S. N., Commanding.
11 Officers, 162 Men.
January 21, 22, 1909.

Regretfully we wished that we had put up such a monument at English Narrows, where it would have been decidedly unique, since ships rarely anchor there. But then, when we were there we had not yet learned the fashion.

At Puerto Bueno the general surroundings are rather attractive looking. Flowering plants are profuse; but underfoot is the same treacherous yielding mat as at English Narrows, instead of solid ground, and away from the beach line the going is bad. At the head of the inner harbor is a picturesque lake whose waters run into the harbor over a 12-foot cascade.* Here live ducks, one of which one of our sportsmen essayed to bring home to dinner; he afterward explained in great detail how he "drew a bead" on the duck (speed 30 knots per hour), but *forgot to set his sliding leaf!*

Indian huts, queer dome-shaped structures with frame work of limbs and branches and coverings of twigs and grass, "haycocks of boughs, covered by skins or by bark strips," some half-dozen of them, were in sight along the shore, but abandoned and in poor

*We named it Lake *Solace.*

condition. The skeleton of a whale lying on the beach told of Indian feasts in days gone by.

At dusk, that is to say about eight o'clock in the evening, of our second day at Puerto Bueno, there came up from the southward, seeking a night's refuge, our first fellow traveler, the steamer *Amasis,* of the Kosmos line, all the way out from Hamburg, touching at many South American ports and bound up the coast, eventually as far as San Francisco. She had a number of passengers on board for Chilean and Peruvian ports. Weather conditions forbade our doing more than exchange the simplest courtesies with them; and our paths separated at early daylight the next morning, the *Amasis* to the northward, we to the southward.

At the crack of dawn on the morning of Saturday, January 23, we were out of Puerto Bueno and on our way to Otter Ridge, which lies between Mayne and Gray Channels of Smyth Channel. The route lay through Sarmiento Channel, Farquhar Pass, Collingwood Strait, and Victory Pass, twisting and turning between high hills on which the recent gale had precipitated a light fall of new snow which could easily be distinguished from the old layer, so well defined was the line of demarcation.

On entering Collingwood Strait the view to the eastward opens out broad and clear, bringing into sight higher mountains than any previously seen, bearing heavier blankets of snow. Here for the first time we caught sight of a large and extensive glacier glinting white, blue, and green in the brilliant sunlight (strangely present just at this moment) and withal most novel and interesting to most of us. The glimpse was but a fleeting one, however, for a change of course, taking us behind a high peninsula, soon shut it out from our view, nor did we see the same one again; but later on, in Magellan Strait, came larger, grander ones to delight the eye.

The approach to Smyth Channel and the groups of islands encumbering it—Long, Orlebar, Summer, Campbell, and the Otter Islands—is about the most prosaic part of the channels. The land is less high, the shores less bold, sandspits and shoals more numerous, and navigation somewhat more intricate. The contrasts of distance and nearness, of light and shade, of form and color, are not nearly so sharp, distinct and pleasing as in the closer waters.

We had originally intended to make an anchorage at Sholl Bay or Port Tamar, in the western mouth of the great strait itself;

Puerto Bueno. The Sign Boards of Visiting Ships.

Lake Solace at Puerto Bueno.

A Glacier.

A Sharp Turn in Smyth Channel.

but learning from Captain Kagelmacher of the *Amasis* that neither of those so-called ports is looked upon with favor by habitual voyagers through the channels, our plans were changed so as to make Otter Ridge the objective. This gave a short day's run from Puerto Bueno, only 95 miles, but promised the prospect of an easy leg through Magellan Strait on the morrow. For a smaller ship Otter Bay would have afforded an excellent anchorage (Cone's Torpedo Flotilla anchored there over night last year) ; but for us it seemed too small. As it was we anchored on the Ridge, outside of the Bay, exactly on the charted spot for a good anchorage ; and good it may be, though our experience can hardly be said to prove it such ; for on getting up our two anchors next morning, one came up minus a stock ball, and the other came up with no stock at all—apparently caught in rock crevices and broken off.

From Otter Ridge the run is about 25 miles down to the intersection of Smyth Channel with Magellan Strait between Cape Phillip and The Stragglers Islands. Shortly after leaving Otter Ridge we came upon another of the silent tragic monuments to the perils of the channels, the wreck of the *Hazel Branch*, hung up in a narrow pass between two little islands, one-half of the hull above water, the other broken off and sunk clear out of sight. Her story is as simple as it is sad ; bearings lost in a thick squall, mistook one island for another just like it, changed course too soon, wrecked.

Passing Cape Phillip, looking off to seaward between squalls we caught sight, but only for a minute, of the renowned Cape Pillar, at the extreme end of Desolation Island. Behind Cape Phillip, St. Anne and St. Agnes, great peaks, remarkable in outline (when visible) stand guard over the strait entrance ; off to the left, eastward, Tamar Island, the pivot point, rises some 1400 feet above the sea level ; and on the shore of Desolation Island to the southward the new light house on Felix Point shows up clear and useful, holding forth promise of untold comfort to many a distressed mariner.

Compared to the narrow passes of the Patagonian Channels the several reaches of Magellan Strait proper are almost as the open sea, the navigable channels averaging perhaps twice the width of those to the northward. Navigation is comparatively free and roomy, so that one feels fairly serene in his mind even when the landscape is shut out for somewhat lengthy periods.

Concerning the scenery, the climate and the weather of the straits much has been written and may be read where found; some, if not all of the writers show signs of a pessimistic frame of mind when discussing this subject, as the following quotations will illustrate. Our actual experience though frequently at high tension was not so terrible; it may be that the day of our traverse of the strait, Sunday, January 24, was one of *the* exceptional days intimated in the quoted paragraph.

> On entering the Strait of Magellan, the first object of interest is a wreck and the second is a lighthouse. During the whole passage . . . . there is scarcely any sign of man's handiwork, except the occasional shipwrecked steamer. Lighthouses, on the other hand, are exceedingly rare. If it should happen that the weather is fine when traversing the straits (and this may be the case at least once in thirty voyages), even then it is cold and inclement at the very height of summer. Glaciers occur here and there. "Looking inland up the numerous channels . . . . one often beholds snowy areas, great gathering grounds of snow, drained by glacier tongues which sometimes terminate in the water." But even in fine weather, the narrow passage, with its precipices of bare, forbidding-looking rocks and intricate island systems is in no way attractive [we "Solacers" thought it was] . . . . It is a land of furious storms and squalls of rain . . . . Generally no land is visible; one can only see blinding rain or storms of sleet and snow for four or five hours at a time; and the intricate passage has to be followed by compass and log without any land view whatever . . . .

That picture is a bit dark and gloomy—as are indeed most of the pen pictures one runs across in reading of this locality—a fact which that writer seemed to realize, for he adds in a sort of apology, "Yet it is not *always* raining, and *there are* days without a violent storm."

We, of the *Solace,* have come to the conclusion that we enjoyed exceptionally fine weather during our journey through Magellan Strait. It was raining not more than half the time, we could generally see both shores at once, or at least they were not both long obscured, and occasionally the sky came out clear and blue, extending our view for miles and miles through inlets, fiords, and valleys, reaching to distant snow-covered peaks and ranges, discovering great glaciers like enormous masses of iridescent molten glass.

The run to Fortescue Bay where we came to anchor for the night of the 24th was accomplished without special event though full of interest throughout. This bay is some 85 miles from Punta Arenas, and "around the corner" (Cape Froward). Here we

began to see houses built by man. A Chilean trapper with his native Indian household, was living on the beach, his "residence" being roofed with galvanized sheet iron. They came alongside in canoes and offered for sale or barter a few eggs and some little baskets woven of a fragrant smelling salt marsh grass. At this place was recorded the lowest outside air thermometer of the entire journey, 40° F. We had a comfortable anchorage for the night, and left the following morning, reaching Punta Arenas in the mid afternoon.

At Punta Arenas the scenic voyage ends. To the eastward, through the Second and First Narrows, items of note are all purely navigational; the land is one vast sand dune across which the wind howls, the water is a rushing, whirling stream.

Punta Arenas itself, and its recent rapid growth, have lately been the subject of a magazine article treating of the resources of South America.

I append a few "SUGGESTIONS by the WAY," the result of no little thought and deliberation in advance of the voyage and of consideration of conditions arising during its progress. Should it appear to any who read that too great stress has been laid upon the "preparations for sinking" as they may be called, and that these preparations themselves indicate undue caution, timidity, or fear, let such readers give a thought or two to the following facts:

(a) The *Solace* is a single-bottomed ship without cellular or reliable compartmental subdivision for watertightness; a hole in the bottom would mean founder more or less quickly.

(b) The inland waters traversed are neither fully surveyed nor accurately charted.

(c) The worst dangers are isolated and hidden to view; they are largely of pinnacle character (of which the lead gives no forewarning) affording no resting place upon which a sinking ship may fetch up short of complete submergence; and even the shores are so steep to that a ship, on filling, slides back into deep water. Note the inclined position of the stricken steamer *Raphael* (photo). Read this eloquent item of *Marine News:*

> The steamer *Mercator* struck an uncharted rock in the Patagonian Channel and sank with all hands in about ten minutes.

Or this:

> The steamer *Jupiter*, in a thick squall, ran on a projecting ledge of Saumarez Island. Efforts were made to beach her, but on filling she slipped

back into deep water and disappeared completely. The crew, with extreme difficulty, managed to get ashore, but suffered severely in this barren, desolate land before being rescued by a passing steamer some days later.

The charts themselves contain this grim notice of warning:

Seamen are cautioned not to make free with these shores, as they are very imperfectly known and from their wild desolate character they cannot be approached with safety.

A minute examination of the chart reveals almost no place at all where a ship could be beached within a short time after striking an obstruction and in shoal enough water to render beaching of any avail.

(d) The shores are barren and inhospitable, productive of no food, having practically no dry land refuge anywhere, and the climate, even in midsummer, is harsh, wet and cold. There are no human habitations for hundreds of miles.

* * * * * * * * *

Suggestions by the Way, to those intending to make the passage of the Patagonian Channels and Magellan Strait from West to East:

1. Make Talcahuano your port of departure.

2. Have your *full* supply of coal on board before leaving Talcahuano: there's no telling how long you may be in getting through to Punta Arenas.

3. Be prepared, at least in your mind, for foul weather and rough seas (in the Pacific); you'll probably encounter them; count yourself to the good if you do not.

4. It is absolutely essential that the compass be well adjusted and an accurate deviation table be obtained and kept at hand. The skies along the Chilean and Patagonian Coasts are most generally cloudy, often precluding astronomical observations by either day or night; so that the position by account must perforce be depended upon in spite of the uncertain element of strong and variable currents. Hence the necessity for accurate compasses. The compensation should be made in as high south latitude as practicable, and for this purpose the smooth waters of Concepcion Bay (Talcahuano) are admirable; also you cannot count upon the sun farther south, and few opportunities to take daily azimuths occur after leaving Talcahuano.

Often also, in running through the Channels and inside passages, the headlands are shut out by squall and mist, and then the compass must be relied upon.

5. The chronometer error and rate should be known as accurately as possible so that when you *do* get an observation which gives a position at variance with your reckoned position, you will not feel doubtful about the observation. Fair comparisons may be had at Callao and Valparaiso, but none at Talcahuano.

6. Study well in advance the charts you'll have to use.

7. Make out a plan, with several alternative plans, covering the proposed voyage; taking full account of the fact that once inside the channels you *must* anchor at nights and that available anchorages for large ships are far from numerous and not always at convenient distances apart. Many of them are a tight fit for a vessel of size.

8. Remember also, that even in the summer months when sunset in these latitudes is late, between 7.00 and 8.00 o'clock, the high mountains on the sides of the channels shut out the light, so that anchorages should be reached by 6 o'clock.

9. As a matter of precaution, bearing in mind that all these shores are barren and that several ships after striking on isolated rocks or even against the steep to shores have gone down suddenly and entirely out of sight; fully provision and water all your boats; have life preservers handy, and, as soon as inland waters are entered, cast off gripes, unhook falls, swing davits, guys, spans, etc., clear, so that in the untoward event of the ship's sudden and complete sinking the lives of the crew may be saved by the boats floating clear of the sinking ship. This suggestion applies more particularly to a ship without D. B. compartments.

A captain in our navy who had more or less recently made the passage of the Strait of Magellan (though not the Patagonian Channels) in one of our large armored cruisers, while describing to me the trip was most enthusiastic about it all—the grand mountain scenery, the glaciers, the snow-capped peaks, the smooth water, the general air of wildness and desolation that hung over the surrounding land and water; he dwelt upon the exhilaration of feeling and spirits due to the novelty of the situation and especially to the spice added by the element of unusual danger from "hiding rock and treacherous shoal" in these constricted and not

fully surveyed waters. Often during our voyage did his description recur to my mind, particularly when mists set in and squalls raged with hail and rain and snow flurries, violently beating into our faces, half blinding us who were on the bridge. And twice, while passing by wrecks, all that remained of what had once been noble ships, I thought with Sherlock Holmes, paraphrasing somewhat his remark to Dr. Watson at the close of "The Boscombe Valley Mystery," "There, but for the grace of God, lies the good ship *Solace*."

But this same grace was ever present with us throughout the journey, conducting us safely from port to port and in the fulness of time to Charleston.

TABLE OF DISTANCES.

Port.	Latitude.	Longitude.	Date of Arrival.	Date of Departure.	Distance.
Magdalena Bay, Mex.	24°36′ N	112°08′ W		Dec. 2, '08	
Pichilinque Hbr., L. C., Mex.	24 15 N	110 19 W	Dec. 3, '08	Dec. 7, '08	330
Panama, R. P.	8 57 N	79 32 W	Dec. 16, '08	Dec. 24, '08	2,221
Callao, Peru	12 04 S	77 16 W	Dec. 30, '08	Jan. 6, '09	1,361
Talcahuano, Chile	36 42 S	73 07 W	Jan. 11, '09	Jan. 15, '09	1,016
Port Ballenas	47 46 S	74 55 W	Jan. 18, '09	Jan. 19, '09	718
English Narrows	48 54 S	74 21 W	Jan. 19, '09	Jan. 21, '09	72
Puerto Bueno	50 59 S	74 12 W	Jan. 21, '09	Jan. 23, '09	134
Otter Ridge	52 24 S	73 41 W	Jan. 23, '09	Jan. 24, '09	95
Fortescue Bay	53 43 S	72 09 W	Jan. 24, '09	Jan. 25, '09	129
Punta Arenas, Chile	53 10 S	70 54 W	Jan. 25, '09	Jan. 30, '09	85
Buenos Aires, Arg. Rep.	34 37 S	58 22 W	Feb. 4, '09	Feb. 10, '09	1,206
Rio de Janeiro, Brazil	22 55 S	43 09 W	Feb. 14, '09	Feb. 23, '09	1,155
Bahia, Brazil	13 00 S	38 32 W	Feb. 26, '09	Feb. 28, '09	701
San Juan, Porto Rico	18 28 N	66 08 W	Mch. 11, '09	Mch. 16, '09	2,045
Charleston, S. C.	32 42 N	79 53 W	Mch. 20, '09		1,158
Total					14,083

"There, but for the Grace of God, Lies the Good Ship 'Solace.'"

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

SERVICES OF COMMODORE JOHN RODGERS IN THE WAR OF 1812 (1812-1815).[1]

By CHARLES OSCAR PAULLIN.

CRUISES IN THE "PRESIDENT" DURING THE WAR OF 1812 (1812-1814).

From the end of the Tripolitan War in 1805 to the beginning of the War of 1812, Commodore Rodgers was the leading officer of the navy in active service. During these seven years he held the most important offices in the gift of the Navy Department—commander-in-chief of the Mediterranean squadron, commander of the New York station and flotilla, and commander of the northern division of ships. By the death of Commodore Samuel Barron in 1810 and of Commodore Samuel Nicholson in 1811, Rodgers was advanced to the second place on the navy list. The one officer above him in rank was Commodore Alexander Murray, of Revolutionary fame. Rodgers, however, was far more widely known than the senior officer of the navy. The affair of the *President* and *Little Belt* had brought him much renown both at home and abroad. At Washington he was highly esteemed by the chief officials of the government. It is said that "when a member of Congress, who had a high idea of the superior and matchless skill of the British and but a very moderate opinion of the skill, enterprise and bravery of his own countrymen, and was therefore discouraged and dismayed at the idea of our building a navy, asked in a tone of despair, 'If we had a fleet where is the man among us who is fit for an admiral of it?'; the answer from all parts of the House was, 'Commodore Rodgers.'"[2]

[1] This article is based upon two chapters of a biography of Commodore John Rodgers, soon to be published by the Arthur H. Clark Company, Cleveland, Ohio.

[2] The *Polyanthos*, October, 1813, p. 1.

As Commodore Murray was too old for duties at sea, Rodgers during the War of 1812 was the senior naval officer in command. Next to him in rank, since the death of Preble in 1807, was Commodore James Barron, who, however, took no part in the war. When his five years' sentence of suspension from the navy expired early in 1813 he was abroad, where he remained for several years. Junior to Barron on the captain's list in 1812 were, in order, Bainbridge, Campbell, Decatur, Tingey, Stewart, Hull, Chauncey, Shaw, and Smith. Of these officers, the department's chief reliance for sea service were Bainbridge, Decatur, Stewart, Hull, Chauncey, and Smith. For several years preceding the war Decatur had stood next to Rodgers in the estimation of the Secretary of the Navy, and he had been given some of the most responsible commands. In 1810 Bainbridge obtained a furlough and entered the merchant service. He made two voyages to St. Petersburg, and appears to have been in Russia when in the fall of 1811 he learned that a war with England was threatening. He at once started for home, and arrived in Boston in February, 1812, after "a very fatiguing journey of twelve hundred miles on the Continent and a dangerous passage of fifty-three days." On his arrival he offered his services to the department, and they were accepted. Of the masters commandant of the navy, Porter, Jacob Jones and Lawrence were destined to achieve most fame; and of the lieutenants, O. H. Perry, Macdonough, Biddle, Warrington, Allen, Burrows, and Elliott were to win the laurels.

Early in 1812 Secretary Hamilton called upon Commodore Rodgers to assist him in performing certain general tasks preparatory to war. In January the secretary had under consideration the establishment of a coast signal system, designed to connect Washington with New York and other leading seaports. His plan provided for a signal code, signal routes, and signal stations in sight of each other. When the subject was referred to Rodgers for consideration, he expressed the opinion that the advantages to be derived from so extensive a system would not justify the large outlay that its installation and maintenance would necessitate. He said, however, that it was very essential that New York and Sandy Hook, distant from each other some thirty miles, should be brought into communication; and later he was ordered by the secretary to connect the two points. Becoming interested in the general subject of signaling, the Commodore devised two signal

codes, one for land and the other for sea, both of which were adopted by the department. A drawing that he prepared representing the different pennants used in his plan for day signaling on board ships of war is still preserved in the naval archives at Washington.

Remembering the confusion during the Tripolitan War caused by two or more commodores flying the same sort of flag when they were in company, Rodgers recommended the adoption by the department of three orders of broad pennants. A pennant of the first order was to be a blue flag with white stars, of the second order a red flag with white stars, and of the third order a white flag with blue stars. When three fleets were in company, the flagship of the senior commodore was to fly the blue pennant; the ship of the commodore next in rank, the red pennant; and that of the junior commodore, the white pennant. The department was favorably impressed with Rodgers' recommendation, and it established the three orders of broad pennants that he proposed.

Before war was declared by the United States, Hamilton wrote to several leading naval officers asking them to prepare a plan of operations for our little navy. The replies of Rodgers, Decatur, and Bainbridge have been preserved. Of these, that of Rodgers, according to the eminent naval authority, Admiral A. T. Mahan, is the "most consonant with sound military views." The Commodore was of the opinion that our ships should take the offensive. According to his plan, a small squadron was to cruise off the British Isles, and some of the lighter vessels were to harrass the enemy's commerce in the West Indies. Occasionally all the frigates were to be united and sent to intercept the British East India convoy. A few ships were to cruise along the trade routes between England and Canada, and a few others along the American coast. Decatur and Bainbridge wished to send the vessels to sea either singly or by twos to attack the merchantmen of the enemy at such points as our commanders should choose. Rodgers' plan was strong in its provision for co-operation and combined action; while the plans of his fellow-officers favored individual movements.

The winter of 1811-1812 the Commodore spent at Newport, being chiefly engaged in overhauling and repairing the ships of his squadron. On March 28, accompanied by the *Essex* he sailed in the *President* for New York. Owing to a heavy gale he was

carried south of the Delaware and did not reach his destination until April 3. Here he was busy for several days establishing a signal service between New York and Sandy Hook and enforcing a new embargo law passed in anticipation of war. On the 9th the Secretary of the Navy, having been informed that the *Guerrière* and another British frigate were molesting our trade in the vicinity of the Delaware capes, ordered Rodgers to put to sea and guard our commerce. For several weeks the Commodore cruised between Sandy Hook and Cape Hatteras, a part of the time in company with Commodore Decatur, but he saw no British vessels.

In accordance with the orders of Secretary Hamilton, Rodgers spent the first days of June at New York repairing and equipping his fleet. In anticipation of hostilities, the secretary wrote to him on June 5 to be prepared "in all respects for extensive service"; and on the 13th, expecting a declaration of war on that day, he wrote "For God's sake get ready and let us strike a good blow." On June 18 the Commodore completed the repairing and provisioning of the *President*, 44, and the sloop of war, *Hornet*, 18, Master Commandant James Lawrence. The frigate *Essex*, 32, Master Commandant David Porter, was not yet ready for sea, since on examination she was found to need a new foremast. On the 19th the fleet of Commodore Decatur consisting of the flagship *United States*, 44; the frigate *Congress*, 36, Captain John Smith; and the brig *Argus*, 16, Lieutenant Arthur Sinclair, anchored in Sandy Hook bay. On the 20th, being informed by General Joseph Bloomfield, commander of the military forces at New York, that war had been declared by Congress on the 18th, Rodgers at once took measures of defense. He ordered the commandant of the navy yard to employ the gunboats, in co-operation with the army, for the protection of New York harbor; he directed Captain Porter to prepare the *Essex* for sea with all possible dispatch; and he declared an embargo on all vessels in port.

On the morning of the 21st Rodgers' ships weighed anchor and joined Decatur's fleet in Sandy Hook bay. The combined squadron consisted of the *President*, *United States*, *Congress*, *Hornet*, and *Argus*. For several hours, with every vessel ready for sea, Rodgers awaited orders from the Secretary of the Navy. He had high hopes of capturing one or more of the British ships of war that had been recently reported to be on our coast. On June 15 the frigate *Belvidera* was seen off Sandy Hook; and on the 19th

Decatur, not knowing that war had been declared, fell in with the British vessels *Tartarus* and *Mackerel* near New York. A more particular object of Rodgers was the intercepting of a fleet of merchantmen that had sailed from Jamaica for England, under convoy, about May 20. According to one report, probably exaggerated, the fleet consisted of one hundred and ten sail and was worth twelve million pounds sterling. The Commodore calculated that on June 21 the Jamaicamen were southeast of New York on the edge of the Gulf Stream.

Both officers and seamen were in high spirits and were eager for adventure. They were resolved not to return to port until they had won new laurels for the navy. When the Commodore received the news of the declaration of war, he ordered the crew of the flagship on deck and addressed them, it is said, after this fashion: "Now lads, we have got something to do that will shake the rust from our jackets. War is declared! We shall have another dash at our old enemies. It is the very thing that you have long wanted. The rascals have been bullying over us these ten years, and I am glad the time is come at last when we can have satisfaction. If there are any among you who are unwilling to risk your lives with me, say so, and you shall be paid off and discharged. I'll have no skulkers on board my ship, by G—d." A general huzza followed this speech, and every man of the crew declared that he would stand by the Commodore.[1]

A similar scene occurred on board the *Hornet*. "Sunday; this morning the declaration of war by the United States against Great Britain was read," wrote one of the midshipmen of that vessel. "At ten o'clock a. m., Commodore Rodgers hove out the signal to weigh. Never was anchor to the cathead sooner, nor topsail sheated to the masthead with more dispatch than upon the present occasion. The smallest boy on board seemed anxious to meet what is now looked upon as the common tyrant of the ocean, for they had heard the woeful tales of the older tars . . . . When the ship was under weigh Captain Lawrence had the crew called to their quarters, and told them if there were any amongst them who were disaffected, or one that had not rather sink than surrender to the enemy, with gun for gun, that he should be immediately and uninjured landed and sent back in the pilot boat. The reply was fore and aft, 'Not one'."

[1] National Intelligencer, July 2, 1812.

At about 3 p. m. of the 21st, Rodgers, being then in Sandy Hook bay with his fleets, received the following orders from Secretary Hamilton, dated June 18: "I apprize you that war has been this day declared between the United Empire of Great Britain and Ireland and their dependencies and the United States of America. You are to consider the vessels under your command as entitled to every belligerent right, as well of attack as defense. For the present it is desirable that with the force under your command you remain in such position as to enable you most conveniently to receive further, more extensive, and more particular orders, which will be conveyed to you through New York. But, as it is understood that there are one or more British cruisers on the coast in the vicinity of Sandy Hook, you are at your discretion free to strike at them, returning immediately after into port. You are free to capture or destroy them. Extend these orders to Commodore Decatur."

Within ten minutes after receiving this message, without waiting for further directions, Rodgers put to sea with his fleet of five ships. He shaped his course to the southeast in expectation of falling in with some vessel that could give him information respecting the Jamaicamen. At 6 p. m. he spoke a pilot boat and was informed that an English vessel had been sighted to the northeastward. Making all sail in chase, he came up with the stranger about 8 p. m., and brought her to by firing a shot across her bows. Unfortunately she proved to be not a vessel of the enemy, but the American ship *Powhatan*. She was bound to France, and had on board as a passenger General Moreau. During the 22d nothing worthy of remark occurred. At 3 a. m. of the 23d the squadron spoke the brig *Indian Chief*, bound from Bermuda to New York. Her master informed Rodgers that two days before he had seen the Jamaica fleet to the northwestward of Bermuda. The Commodore now steered to the eastward with all canvas set in pursuit, calculating that the fleet had some three hundred miles the start of him.

At about 6 o'clock of the morning of the 23d, when the squadron was one hundred miles southwest of Nantucket Shoal, a ship was discovered in the northeast, standing directly towards the American vessels. The stranger later proved to be the British 32-gun frigate *Belvidera*, commanded by Captain Richard Byron, a brave and skilful officer of the Royal Navy. She actually mounted

forty-two guns; twenty-six long 18-pounders, two 9-pounders, and fourteen 32-pounder carronades. She was considerably weaker in force than either one of the three American frigates, *President, United States* or *Congress*.

On sighting the stranger, Rodgers signalled his vessels to chase, which they at once did, under a heavy press of sail. On seeing that she was pursued, the *Belvidera* turned about and fled, shaping a northeasterly course. The wind during the day blew from NNW. to WSW., and varied in force from light to moderate. As the American ships were recently out of port, they were deep in the water, and therefore sailed under a disadvantage. During the forenoon, however, they gained gradually on the *Belvidera*. The *President*, being the fastest ship of the fleet, was considerably in the lead of the *Congress*, the formost of the four other pursuing vessels. At 11 a. m., expecting soon to overtake the enemy, the Commodore ordered his flagship cleared for action. About an hour later the *Belvidera* also made preparations for battle. Both vessels hoisted their colors. The broad pennants of Rodgers and Decatur were discernible from the British ship. At noon the Commodore was about three miles from the chase, and almost directly south of Nantucket Shoal, distant fifty miles. The wind now became lighter and inclined more to the southwestward. These changes in the weather favored the *Belvidera*. The *President* gained on her more slowly, and the other ships of the squadron dropped farther to the rear. At 4 p. m. it was doubtful whether the flagship was really decreasing the lead of the chase.

The Commodore had planned to lay his vessel alongside of the *Belvidera* and open fire with a broadside. He had approached within easy gunshot of her. Both ships were steering about the same course. Perceiving that he was not likely to overtake the enemy's ship and that she was training her stern guns upon him apparently with the intention of injuring his spars and rigging, Rodgers at 4.20 p. m. gave orders to begin firing with his bow guns, with a view to crippling the *Belvidera* above deck and reducing her sailing power. Both vessels, continuing under full sail, now engaged in a running fight. It opened with three shots from the *President*, each one of which did execution. One of them struck the rudder coat of the *Belvidera* and entered the gun-room, and another hit the muzzle of her larboard chase gun. The third killed one seaman, mortally wounded the armorer, and wounded

less severely a lieutenant, a ship's corporal and two seamen. The British ship returned the fire with her four stern chasers.

Commodore Rodgers directed in person the firing on board the *President*. He is said to have pointed the gun that fired the first shot of the engagement, which was the first shot of the War of 1812. Some fifteen minutes after the fight began a most unfortunate accident occurred on board the flagship. One of her bow chasers, which was in charge of Lieutenant Thomas Gamble, burst, killing Midshipman John Taylor and wounding fourteen men, among whom were Rodgers, Gamble, and Midshipman M. C. Perry. The Commodore was blown into the air, and in falling on the deck fractured a bone of one of his legs. Supported by his men, he continued to direct the fight. These casualties Rodgers said in his official report of the engagement were not the most serious injuries received by the *President*:

> By the bursting of the gun and the explosion of the passing-box from which it was served with powder, both the main and forecastle decks (near the gun) were so much shattered as to prevent the use of the chase gun on that side for some time. Our main-deck guns being single-shotted, I now gave orders to put our helm to starboard and fire the starboard broadside in the expectation of disabling some of his spars, but did not succeed although I could discover that his rigging had sustained considerable damage and that he had received some injury in the stern.
>
> I now endeavored by altering our course half a point to port and wetting our sails to gain a more effective position on his starboard quarter but soon found myself losing ground; after this a similar attempt was made at his larboard quarter, but without any better success, as the wind at this time being very light and both ships sailing so nearly alike that by making an angle of only half a point from the course he steered, enabled him to augment his distance. No hope was now left of bringing him to close action except that derived from being to the windward and the expectation that the breeze might favor us first. I accordingly gave orders to steer directly after him and to keep our bow chase guns playing on his spars and rigging until our broadside would more effectually reach him. At 5, finding from the advantage his stern guns gave him that he had done considerable injury to our sails and rigging and being within pointblank shot, I gave orders to put the helm to starboard and fire our main-deck guns. This broadside did some farther damage to his rigging and I could perceive that his fore-topsail yard was wounded, but the sea was so very smooth and the wind so light that the injury done was not such as materially to affect his sailing. After this broadside our course was instantly renewed in his wake under a galling fire from his stern chase guns directed at our spars and rigging, and continued until half-past 6, at which time being within reach of his grape and finding our sails, rigging and several

spars, particularly the main yard, which had little left to support it except the lifts and braces, very much disabled, I again gave orders to luff across his stern and give him a couple of broadsides.

The enemy at this time finding himself so hardly pressed and seeing, while in the act of firing our broadside, our head sails to lift and supposing that the ship had in a measure lost the effect of her helm, he gave a broad yaw with the intention of bringing his broadside to bear. Finding the *President*, however, answered her helm too quick for his purpose, he immediately resumed his course and precipitately fired his four after main-deck guns on the starboard side, although they did not bear at the time by twenty-five or thirty degrees; and he now commenced lightening his ship by throwing overboard all his boats, waist anchors, etc., and by this means was enabled by a quarter before 7 to get so far ahead as to prevent our bow guns doing execution. And I now perceived with more mortification than words can express that there was little or no chance left of getting within gunshot of the enemy again, under every disadvantage of disabled spars, sails and rigging. I, however, continued the chase with all the sail we could set until half-past 11 p. m., when perceiving he had gained upwards of three miles and not the slightest prospect of coming up with him, I gave up the pursuit and made the signal to the other ships as they came up to do the same.

The *President* was the only vessel of Rodgers' squadron that took part in the engagement. At one time the *Congress*, the headmost of the other four ships, was within two gunshots of the *Belvidera*, and she fired several shots, all of which, of course, fell short. The *United States*, *Hornet* and *Argus* did not waste any ammunition on the enemy. The *Hornet* broached a barrel of beef and expended ninety-five gallons of water in an attempt to increase her speed. The *President* inflicted more damage than she received. She lost two men killed and five wounded (not counting the casualties caused by the bursting of her gun), while the *Belvidera* had two men killed and twenty-two wounded. The main-topmast and cross-jack yard of the British ship were badly injured, and her sails and rigging were much damaged. The *President* also suffered considerably in her spars and rigging. Captain Byron was severally wounded by the breaking of the breechings of his guns. He was, however, cool and determined, and in the midst of the fight repaired many of the injuries received by his ship. He conducted his defense with great skill and judgment and deserves much praise for his escape from a superior force.

Rodgers displayed his usual ability, gallantry and resolution. Notwithstanding he was severely wounded he remained on deck and directed the fight. The tactics that he adopted were such as

under the circumstances seemed to him best, and, although they did not effect the capture of the fleeing ship, it is by no means certain that other tactics would have been more successful. Captain Byron is reported to have said that the Commodore did all that any commander could have done to take the *Belvidera*. One of Byron's officers ascribed the escape of the British ship to her superior sailing near the close of the fight caused by the throwing overboard of a part of her equipment—her spare sheet anchor, small bower anchors, barge, yawl, galley boat, and fourteen tons of water. Rodgers' critics have censured him for not laying his ship alongside of the enemy instead of yawing and delivering broadsides. They assert that the time he thus lost, had it been expended in sailing a straight course, would have brought him up even with the chase. This is by no means certain, since during the fight the two ships were sailing at nearly the same rate. The critics also say that the Commodore could have done more damage by a continued use of his chase guns. It should be remembered, however, that by the unfortunate accident on board the *President* the force of these guns was considerably reduced.

After repairing the spars and rigging of his flagship, Rodgers resumed his course in pursuit of the convoy. Nothing was heard of it until June 29, when he fell in with an American schooner from Teneriffe, whose master informed him that two days before he had passed it one hundred and fifty miles to the northeastward. The Commodore now crowded all sail in chase. On July 1 to the eastward of the Grand Banks he discovered some cocoanut shells, orange peels, and other refuse of tropical products floating on the water—signs that indicated the proximity of the Jamaicamen. Now and then the Commodore interrupted his pursuit long enough to chase, speak and capture a vessel of the enemy. On July 2 he took the brig *Tionella* bound from the Bay of Fundy to Newcastle, the first naval prize of the war; and on the 4th the brig *Dutchess of Portland*, both of which vessels he burned. On the 9th to the northward of the Azores he captured the privateer *Dolphin*, of Jersey, 10 guns, and sent her to Philadelphia in charge of a prize master. Some of her men reported that they had seen the convoy on the preceding evening.

Rodgers continued the chase until he was within twenty hours of the British channel, and on July 13 he reluctantly abandoned it. He now steered southward along the coast of Spain and Portugal.

On the 21st he was off Madeira. Three days later he captured to the northwestward of the Canaries the English letter of marque *John*, 16 guns, and sent her to America. From this point the squadron shaped its course for the Azores. Passing near the westernmost group of those islands, it sailed thence to the Grand Banks, and thence by way of Cape Sable to Boston. On the homeward voyage four more ships were captured: *Argo*, *Adeline*, *Betsey*, and *Hiram*. Every vessel that was seen during the cruise was overhauled except the *Belvidera*, two American ships, and a frigate supposed to be British. The latter was discovered at 4 p. m. on August 28 near Georges Bank. The *President* chased her and gained upon her until she was lost in the approaching darkness.

During the first part of the voyage the weather was frequently so foggy that the ships of the squadron could not discern each other a cable's length apart. For July 18 Midshipman M. C. Perry of the flagship has the following entry in his journal: "At 4 a. m. foggy weather, discovered a sail close aboard of us, called all hands, beat to quarters, and cleared ship for action. At half-past 4 the fog cleared away, discovered the strange sail to be the *Hornet* that had got separated from the squadron during the night, beat the retreat." For the last day of the cruise, August 31, Perry has this entry: "At daylight discovered a frigate lying in Nantasket Roads, cleared ship for action and stood for her. At 7 she proved the frigate *Constitution* from a cruise, having captured the British frigate *Guerrière*. This day moored ship in Boston harbor." The Commodore returned to port sooner than he otherwise would have done had not the scurvy made its appearance on board the ships of his squadron. On the *United States* and *Congress* alone three hundred men were sick with this fearful disease.

Rodgers was more or less disappointed with the results of his cruise, for he had failed either to overhaul the Jamaicamen or to capture a ship of war. He had, however, taken eight English merchantmen, and he had been quite successful in effecting another object. "My calculations were," he wrote to the Secretary of the Navy, "even if I did not succeed in destroying the convoy, that leaving the coast in the manner we did would tend to distract the enemy, oblige him to concentrate a considerable portion of his most active force and at the same time prevent his single cruisers from laying before any of our principal ports from their

not knowing to which port or what moment we might return; and it is now acknowledged even by the enemies of the administration that this disposition has been attended with infinite benefit to our returning commerce." Viewed thus, the Commodore's cruise was the most successful one of the War of 1812.

"We have been so completely occupied in looking out for Commodore Rodgers' squadron," wrote a British officer on the North Atlantic station, "that we have taken very few prizes." "Our trade with little exception," said President Madison in his annual message for 1812, "has safely reached our ports, having been much favored in it by a squadron of our frigates under the command of Commodore Rodgers." The Navy Department took an exceedingly favorable view of the results of the cruise. After congratulating Rodgers on his safe return, it added: "Although your cruise may have not been so fortunate as you could have wished, yet in having kept the sea you have induced the enemy to concentrate a considerable portion of his most active force; lessened his chances of capturing our merchant vessels; and of course enabled a great number of American vessels, which might and probably would otherwise have been captured, to reach their ports of destination. In this view, sir, you have most unquestionably rendered important services to your country. Your next cruise may be more glorious, but I shall consider it particularly fortunate if it should be attended with more substantial benefits to our country."

On arriving at Boston, Rodgers at once prepared his ships for another cruise by refitting them, enlisting seamen, and laying in a supply of water and provisions. The recent successes of Hull in capturing the *Guerrière* and of Porter in taking the *Alert* made the Commodore all the more anxious to be again at sea, hoping as he wrote to Hamilton "that fortune will be more kind to me individually in my next cruise and that I may have it more in my power to demonstrate that there is no sacrifice I would not make for the benefit of my country." Before Rodgers was ready to sail a cartel arrived from Halifax with Lieutenant W. M. Crane and his officers and crew. They had been captured in July with their vessel, the brig *Nautilus*, the first naval prize of the British. On learning that Admiral Sawyer had sent six seamen of the brig to England on the plea that they were Englishmen, Rodgers ordered the detention of twelve seamen of the crew of the *Guerrière*

as hostages for the six Americans. The duty of ordering a court-martial to investigate the loss of the *Nautilus* also fell to the Commodore at this time.

Early in the fall of 1812 the Navy Department issued orders dividing its little seagoing fleet into three divisions of three vessels each. To Rodgers fell the command of the *President, Congress,* and *Wasp;* to Decatur, the *United States, Chesapeake,* and *Argus;* and to Bainbridge, the *Constitution, Essex,* and *Hornet.* As the *Wasp,* Master-Commandant Jacob Jones, was at Philadelphia, the Commodore ordered her commander to proceed to sea and to cruise in certain specified latitudes until joined by the *President* and *Congress.* Early in October these two latter vessels, together with the *United States* and *Argus,* were at Boston ready for active service. In order to give the enemy an erroneous impression of their intended movements Rodgers and Decatur sailed from port in company. A few days later they separated. Before sailing the Commodore heard that the British fleets off the Delaware and the Chesapeake consisted of only two vessels each. Had he received some confirmation of this report, he would have sailed southward along the coast "in the hope," as he wrote, "that God in his infinite goodness will permit us to get, for once, fairly alongside of them, ship for ship." He finally decided to take an easterly course. Two days out of Boston he sighted and chased the British frigate *Nymphe,* 38, but owing to the lightness of the wind and the approach of night, he failed to overtake her. She belonged to a fleet of five frigates, and the Commodore must have passed near her consorts, although he did not see them.

On October 15, after a two hours' chase in which the *President* carried away her main-topgallantmast, Rodgers captured, to the southward of the Grand Banks, His Britannic Majesty's packet *Swallow,* 10 guns, Master Joseph Morphew. She was bound from Jamaica to Falmouth, and had ten tons of gold and silver specie on board worth about $175,000. On the same day he fell in with the American schooner *Eleanor,* bound for France. As she had been recently dismasted, her master and crew agreed to abandon her and return to the United States with the packet, which the Commodore turned over to them after having taken on board the *President* the gold and silver specie.

Rodgers now shaped a course toward the Canaries. On the

morning of November 1, when some four or five hundred miles south-southwest of the Azores, he discovered three strange sail to the southward, and at once gave chase, signaling the *Congress* to do the same. About noon one of the three ships carried away her foremast and was immediately captured. Leaving the *Congress* to take possession of her, the Commodore pursued one of the other two vessels, which was about fifteen miles from him. He gradually gained on her and by sunset had reduced her lead some five or six miles. On the approach of darkness he gave up the pursuit and joined the *Congress*. The third ship also effected her escape. The prize proved to be the whaler *Argo*, 10 guns, laden with a valuable cargo of whale-oil, whalebone and ebony. The vessel chased by Rodgers was the frigate *Galatea*, 36 guns, which was convoying the little fleet from St. Helena to England; and the third ship was the whaler *Admiral Barclay*, partly loaded with oil.

Passing to the westward of the Cape Verdes, Rodgers ran down the trades in 17° N., and near the 50th meridian he shaped his course for the Bermudas. For four weeks he cruised to the northward and northwestward of those islands. The latter half of the cruise was quite uneventful, since few vessels of any kind were sighted. "No remarkable occurrence this day" is a frequent entry in the journal of Midshipman Perry. On one Sunday he records, "Called all hands and performed divine service"; and on another, "Called all hands to muster and read the articles of war." Now and then he notes the death of a seaman and the "Committing of his body to the deep." For December 21 he made the following entry: "Commences with strong gales from the north and westward and a heavy sea, laying to. At half-past 3 beat to quarters and housed the gun-deck guns. At 9 set the fore-staysail. At 10 a heavy sea struck the ship a beam, carried away the starboard hammock stations, killed John Armstrong and Joseph Dunsdan (seamen) and wounded six men, broke the lower studding-sail boom, and started the launch, broke in three half-ports and started all the others; the hatches being off for the purpose of passing shot below, took in a great quantity of water; rigged all the pumps, battened the hatches down, and soon cleared her."

The Commodore remained at sea until his provisions and water were exhausted. Compelled then to return to port, he sailed for

Boston where he anchored on December 31, 1812, after a cruise of eighty-five days and nearly eleven thousand miles. He had seen but five British vessels, and two of these he had captured. Rodgers' inability to discover the enemy is not surprising, for the British government was now strictly enforcing its laws compelling British ships to sail in squadron and accompanied by convoy. Rodgers' third ship the *Wasp* left the Delaware on October 13. Four days later, between the Bermudas and Halifax, she fell in with the British brig *Frolic* and captured her after a well-fought engagement, in which the Commodore's brother, Lieutenant G. W. Rodgers, distinguished himself. Soon after the fight, the *Wasp* and her prize were captured by the British seventy-four *Poictiers*.

The squadrons of Decatur and Bainbridge were more fortunate than that of Rodgers. Decatur's flagship, the *United States*, captured the British frigate *Macedonian*, 38, to the southward of the Azores, and his two smaller vessels took several merchantmen. Bainbridge's fleet was the most successful of all. His flagship, *Constitution*, captured the frigate *Java*, 38, off the coast of Brazil; and the sloop *Hornet*, Master-Commandant James Lawrence, the brig *Peacock*, 18, off Demerara. His third vessel, the *Essex*, Captain David Porter, signalized herself by entering the Pacific and making the most notable cruise of the war as respects depredations on British commerce.

The Commodore was busily employed during his four months' stay in Boston. The *President*, after her two long cruises, needed many repairs. As the winter of 1812-1813 was a very severe one, the work on her proceeded slowly and she was not again ready for sea until the middle of spring. While Rodgers was at Boston, the Massachusetts legislature sought his advice regarding the defense of that city. In response to a request of a committee of merchants, he officered and manned the privateer schooner *General Hull*, and sent her to sea to protect the coasting trade between Boston and Martha's Vineyard. Off Cape Cod she was fired into by the American privateer *Anaconda* and her commander, Lieutenant Henry S. Newcomb and two seamen were wounded. On March 2, 1813, the Commodore, with Captains Hull and Smith, attended a splendid dinner at the Exchange Coffee-House, in Boston, given to Commodore Bainbridge and his officers in honor of their victory over the *Java*. On this festive

occasion, Rodgers responded to the toast, "The citizens of the State of Massachusetts."

From the spring of 1813 until the end of the war the British maintained a rigorous blockade of the chief American seaports. During 1813 only six of our naval ships succeeded in getting to sea—*President, Congress, Chesapeake, Enterprise, Argus,* and *Constitution.* The last-named ship did not run the blockade until one of the last days of December. To evade the fleets of the enemy, in leaving port and in returning, now required considerable skill and good fortune. Late in May, 1813, the *United States, Macedonian,* and *Hornet,* in attempting to go to sea from New York by way of Long Island Sound were chased into New London where they remained for many months. The *Constellation* was blockaded at Norfolk during the whole year.

Hoping to induce the enemy to relax the blockade, the Secretary of the Navy decided to attack the British merchantmen at as many points as possible. He therefore ordered his ships to cruise singly along the principal trade routes of the North Atlantic. This order left Rodgers the command of only the frigate *President.* By the middle of April, 1813, the *President* and the frigate *Congress,* Captain John Smith, were ready for sea. In expectation of encountering the British frigates *Shannon* and *Tenedos,* which vessels were blockading Boston and had indicated their desire of meeting the American ships, Rodgers and Smith decided to leave port in company. On April 23 they dropped down to President Road, four miles from the city, where, owing to head winds, they remained a week. They sailed on the 30th, but were compelled to beat about in Boston bay until May 3. They saw nothing of the *Shannon* and *Tenedos,* since the British frigates had temporarily left the coast on account of easterly winds. On the afternoon of the 3d they chased a brig of war near Georges Shoal. They also sighted two other vessels, which the Commodore supposed were the *Hogue,* 74, and *Nymphe,* 38. On May 8 the *President* and *Congress* parted company.

Hoping to intercept the enemy's West India trade, homeward bound, the Commodore cruised for a time to the southward of the Grand Banks. Not meeting any vessels in that quarter except American ones from Lisbon and Cadiz, he turned northward and spent several days on the eastern edge of the Banks along the routes of the West India, Halifax, Quebec, and St. Johns trades.

Here he experienced thick fogs and saw no British vessels. Toward the end of May he steered southeasterly, and remained for a week or more to the westward of the Azores. Falling in with an American ship bound to Cadiz, he learned that she had four days previous passed a West India fleet, under convoy, returning home. With a view to intercepting it, he crowded all sail to the northwestward, but saw nothing of the West Indiamen. He, however, between June 9 and June 13 made four captures: the brig *Kitty*, 2 guns, bound from Newfoundland to Alicant; the packet *Duke of Montrose*, 12 guns, bound from Falmouth to Halifax; the letter of marque *Maria*, 14 guns, and the schooner *Falcon*, 2 guns, both bound from Newfoundland to Spain. The *Kitty*, *Maria*, and *Falcon* were laden with codfish. Rodgers sent them to France in charge of prize masters. The packet he sent to England as a cartel, with seventy-eight prisoners.

The Commodore now decided to proceed northward of the British Isles, with a view to falling in with the Newfoundland trade on his way and to intercepting the enemy's northern trade after reaching his cruising grounds. Not until he made the Shetland Islands did he see a single vessel of any kind. Since his provisions and water now needed replenishing, he sailed for the coast of Norway and arrived at Bergen on June 26, latitude 61° N. On nearing port, Midshipman M. C. Perry was dispatched in a cutter to obtain a pilot. He landed on the small, sterile island of Udvaer, which was inhabited by only a few fishermen. At first the inhabitants were afraid of him, but on finding that he was not an Englishman received him hospitably and offered him milk, fish, and brown bread as tokens of their friendly feelings. He returned to the ship with two fishermen, who piloted the *President* into the harbor. She was the first American ship of war to visit a Norwegian port.

Previous to anchoring, the Commodore sent Lieutenant C. W. Morgan on shore to inform the commander of the local military forces of the character of the American ship and to confer with him about the firing of salutes. Morgan was politely received by the Norwegian officer, who expressed his readiness to return the compliments of the Commodore, gun for gun. After the *President* had fired a salute of seventeen guns and they had been answered by the fort, the commander sent one of his aides on board the ship to welcome the visitors. On June 29, Rodgers, accompanied by

several of his officers, paid a visit of courtesy to the Governor of Bergen and to the commander of the military forces, who received him with much civility. During his stay in port he dined at the house of Herman Diedrich Jansen, one of the most opulent and respectable merchants of the place, and the father of the American consul. Here he met all the chief celebrities of Bergen, including the governor, commander, and bishop of the province.

As the residents of Bergen had never before seen an American naval vessel, they were greatly interested in the *President*. "Soon after anchoring," Rodgers wrote in his journal, "the whole bay in which we lay appeared alive with boats crowded with spectators of all classes, and continued so not only the afternoon but during the whole night. Indeed it appeared as if their curiosity could never be gratified, as the only pleasure the inhabitants of the city and surrounding country appeared to take was in rowing round the ship; and this they continued to do night as well as day from the hour of our arrival until the moment of our departure."

Owing to a scarcity of provisions in Bergen, there being only a months' supply of bread for the inhabitants, Rodgers obtained but sixteen barrels of coarse rye meal and a little cheese. After taking in water, he sailed on July 2 for the Orkney Islands; thence he stretched towards the North Cape on the northern coast of Norway with a view to intercepting a convoy of twenty-five or thirty vessels which were expected to leave Archangel about the middle of July. On the 12th he captured the brig *Jean and Ann*, and on the 18th the brig *Daphne*, both in ballast and bound to Archangel. After removing their crews and stores, he burned them. On the 18th he fell in with the American privateer schooner *Scourge*, of New York. He had now reached the northwest coast of Norway, latitude 71° N. It was midsummer, and at midnight the sun was still above the horizon.

At 4 p. m. of the 19th, while the *Scourge* was still in company, the Commodore discovered two strange ships in the west-southwest, and at once made sail in chase of them. Owing to hazy weather, he was unable to ascertain their character with precision. At the end of a three hours' chase, when about five miles from the strangers, he made them out to be a British line-of-battle ship and a frigate—vessels greatly his superior in force. To avoid them, he hauled by the wind and tacked to the northward and

westward. Pursued by the strangers, he continued his flight for about ninety hours. Early in the chase the *Scourge* parted company with him. As the weather was often hazy, the pursuers and pursued at times lost sight of each other for several hours. About noon of the 21st, when the enemy was rapidly gaining on him, Rodgers cleared his ship for action. In the afternoon, however, the *President* outsailed her pursuers, and towards evening ran them out of sight. On the 22d the Commodore tried to separate the two ships and engage the smaller one, which was in advance of her consort. He shortened sail, hoisted his colors, and fired a gun to windward. Refusing to fight on these terms, the smaller vessel hove to and waited for the larger one to come up. On the morning of the 23d the *President*, having outsailed the enemy's ships, lost sight of them for the last time.

The Commodore's officers agreed with him that the strangers were a line-of-battle ship and a frigate, as may be seen from the day-book of the *President*, kept by Lieutenants Rapp, Morgan, R. H. J. Perry and Newcomb; and the journal of the *President*, kept by Lieutenant M. C. Perry. The latter officer, under date of July 19, made the following entry: "At 7 p. m. found the two sails to be a line-of-battle ship and a frigate." It is now known that the Commodore and his officers were mistaken, and that the two strangers were His Majesty's ship *Alexandria*, 38, and sloop of war *Spitfire*, 16. From the rates of these vessels, it would appear that had Rodgers engaged the enemy his chances of success would have been excellent. Before rendering a final judgment on this point, however, it would be necessary to obtain an accurate statement of the number of men and the number and caliber of the guns carried by both the American and British ships.

Disappointed in not meeting the convoy, Rodgers left the coast of Norway and sailed southward, cruising for a time to the northward of Scotland with a view to intercepting the northern trade of the enemy bound in and out of the Irish channel. He now captured three prizes: the ship *Eliza Swan*, 8 guns; the bark *Lion*, 8 guns; and the brig *Alert*. He ransomed the ship and bark and sent them to England as cartels, loaded with prisoners. Hearing that the British had a superior force on the lookout for him, the Commodore decided to change his cruising grounds. Passing to the westward of the British Isles, he proceeded to the Banks of Newfoundland, near which he made two more captures:

the brig *Shannon*, bound from St. Kitts to London and laden with rum, sugar and molasses; and the brig *Fly*, 6 guns, bound from Jamaica to London, with a cargo of coffee. He sent the two prizes to the United States.

As the *President's* provisions were now nearly exhausted, the Commodore was forced to return to port. On September 23, near Nantucket Shoal, he captured the British naval schooner *High Flyer*, Lieutenant George Hutchinson, five guns, five officers, and thirty-four men. On sighting the *President*, Hutchinson hoisted a signal. Rodgers, knowing some of the enemy's signals, replied in such a way as to mislead the British lieutenant, who, taking the American vessel for the British frigate *Sea Horse*, immediately bore down and hove to under her stern. The Commodore now sent one of his officers, disguised in a British uniform, on board the schooner. Hutchinson received him kindly and on request delivered to him the signal books of the *High Flyer*. The credulous lieutenant then went on board the *President*, or *Sea Horse* as he thought, and was shown to the Commodore's cabin. He gave his supposed superior a copy of his orders from Admiral Warren, who, he said, was especially desirous of capturing the *President* and her commander. The Commodore asked him what kind of a man Rodgers was. Hutchinson replied that he had never seen him, but that he had heard that he was an "odd fish and hard to catch." "Sir," said Rodgers, with startling emphasis, "do you know what vessel you are on board of?" "Why, yes sir," he replied, "on board His Majesty's ship *Sea Horse*." "Then, sir, you labor under a mistake," said Rodgers, "you are on board the United States frigate *President*, and I am Commodore Rodgers." Hutchinson was completely mystified, and it was sometime before he could realize that he had been deceived.[4]

From the documents that the Commodore obtained from Hutchinson he rightly concluded that Newport was more likely to be free of blockading vessels than Boston, off which place lay several ships of Admiral Warren's fleet. He therefore sailed for the Rhode Island port where he arrived safely on September 26. Soon he proceeded up the Narragansett bay to Pawtucket and later to Providence, these towns being more secure from attack by British vessels than Newport.

[4] Lossing, Field-Book of the War of 1812, 735-736.

Rodgers' third cruise had lasted almost five months. For the greater part of this time his officers and crew had subsisted on a scanty allowance of the roughest fare, but their health had been generally good. The *President* had captured twelve vessels and two hundred and seventy-one prisoners. During 1813 only two other ships of war were more successful, the brig *Argus* in the British channel, and the frigate *Essex* in the South Pacific. Each of these ships, however, closed its career by falling into the hands of the enemy. A comparison of the *President's* work with that of the four other vessels that went to sea in 1813 is of interest. The *Congress* visited the southern part of the Atlantic and took four small prizes. The *Constitution* sailed too late to make any captures. The *Chesapeake*, soon after leaving Boston, engaged the *Shannon* and after a gallant fight surrendered to her. The little *Enterprise* had a very successful cruise in which she captured the *Boxer*. The bold dash of the *President* into the North Sea, however, gave more employment to British ships of war than the combined movements of all the other vessels. During July and August some eight or ten naval craft, including two seventy-fours, and several frigates were searching for her. The Secretary of the Navy justly congratulated the Commodore on abstracting the attention of the enemy's navy, "to an extent perhaps equal to the disproportion of our relative forces."

By the middle of November the Commodore was again ready for sea. Owing to adverse winds and the presence of a British squadron near Block Island, he did not sail until December 4. Fortunately he succeeded in eluding the vessels of the enemy that were watching for him. On the second day out he recaptured the American schooner *Comet*, which had been lately taken by His Britannic Majesty's ships *Ramilies* and *Loire*, and was bound to Halifax in charge of a prize crew. On December 6 he discovered a British ship of war, but, knowing that he was near a squadron of the enemy, he refrained from chasing her. He, however, shortened sail and hove to with a view of offering battle, but the strange ship stood from him.

Rodgers now sailed for more southerly latitudes, shaping a course for the Canaries. Later, running down the fifteenth parallel, he proceeded to the West Indies. While on this latter course he fell in with the French frigates *Medura* and *Nymph*, which he chased for a time, believing them to be English vessels. For

several days he cruised to the windward of the Barbadoes along the routes of ships outward bound from England. Here early in January he captured the merchantmen *Wanderer*, 7 guns, and *Edward*, 6 guns, both of which he sank after divesting them of all valuable articles. On January 16 he ran off Cayenne, thence down the coast of Surinam, Berbice and Demerara, thence northeastward to the south coast of Porto Rico, and on through the Mona Passage along the north side of the Bahamas to the Florida coast, which he sighted near St. Augustine.

On February 4 the Commodore captured the British schooner *Jonathan*, bound from Barbadoes to Amelia Island and laden with rum and dry goods. From Florida he proceeded northward on soundings along the Atlantic seaboard. Running into a blockading squadron on the coast of South Carolina, he tried to separate one of its ships from her consorts, but failed. Pursued finally by the whole fleet, he made his escape. Off the Delaware, during a foggy spell of weather, the Commodore sighted a large vessel that appeared to be a ship of war. He shortened sail and cleared his ship for action; but on hearing signal guns he stood away, believing that he had run into another blockading squadron.

On February 18, off Sandy Hook, Rodgers saw two British ships of war, one of which he made out to be a schooner. When the larger vessel cautiously approached him, he prepared for battle and stood towards her; thereupon she immediately retreated. The Commodore suspected that she might be something more than a frigate. He, however, once more stood towards her; and she again retreated. A revenue cutter now overhauled him, bringing the information that his adversary was really a seventy-four. About this time a third British sail was discovered. Believing that the enemy's force was superior to his own, Rodgers crossed Sandy Hook bar and made the port. It later appeared that the revenue cutter was mistaken, and that the strangely-acting vessel was the British frigate *Loire*, 38, Captain Thomas Brown. Had the Commodore forced an engagement, his chances of success would probably have been good, although we can not be certain of this as the *Loire* would have been aided by her two consorts.

Rodgers had now completed his fourth and last cruise in the War of 1812. While his services had been less brilliant and picturesque than those of some of his fellow-officers, they had yet been highly useful and creditable. The Navy Department freely

expressed its appreciation of his work, and the people acclaimed him a naval hero—placing him on a pinnacle of fame somewhat below Hull, Perry, Macdonough, Decatur, and Bainbridge. Early in March, 1814, Tammany Hall gave a banquet in his honor, at which more than three hundred guests were present. During the festivities a song entitled "The Warrior's Return," which had been "hastily committed to paper," was sung. On this occasion Rodgers proposed a toast which was received with great applause and which later attained a wide popularity: "Peace; if it can be obtained without the sacrifice of national honor or the abandonment of maritime rights, otherwise, war until peace shall be secured without the sacrifice of either." After the banquet the Commodore and several of his officers attended the Park Theater, where he was honored by an illumination and the exhibition of a large transparency displaying his likeness.

Later Rodgers was feasted at Barney's Inn, Baltimore, by the leading men of that city. Here he proposed the sentiment, "The citizens of Baltimore; as conspicuous for hospitality as for enterprise and patriotism." After he had withdrawn in accordance with the custom then prevailing, the presiding officer, who was the mayor of the city, gave the toast, "Commodore Rodgers; hated and feared by the enemy, revered and beloved by his countrymen."

The Commodore's name often figured in the patriotic ballads inspired by the war, although somewhat less frequently than the names of the more popular naval commanders. One of these effusions entitled "Our Navy," after appropriate references to "the gallant Hull" and "brave Decatur's dauntless breast," celebrated Rodgers' martial deeds in the following stanza:

> And Rodgers with his gallant crew,
> O'er the wide ocean ride,
> To prove their loyal spirits true,
> And crush old Albion's pride.

Commodore Rodgers was more or less disappointed with the results of his cruises in the *President;* and during the last year of the war was anxious to return to sea, believing that a kinder fortune would attend him. While he had taken one British ship of war, the schooner *High Flyer,* he had not, like many of his brother-officers, met the enemy in a fair fight, gun for gun. His juniors in rank had fought the sea-duels of the war. His critics asserted that it was extraordinary that he should have traversed

all parts of the Atlantic without finding an opportunity to bring his vessel advantageously into action. A comparison of Rodgers' services with those of his fellow-commanders will not be without interest.

The three main objects of our cruisers at sea in the War of 1812 were, (1) the spoliation of British commerce, (2) the capture of the enemy's smaller ships of war, (3) and the giving of employment to the enemy's vessels with a view to restricting their use on the American coast. The work of Rodgers as a destroyer of commerce, compares most favorably with that of the other commanders. The average number of prizes (disregarding ships of war) taken by our naval vessels in 1812-1815 was 6.5; and by privateers 2.7.[5] The Commodore captured twenty-five merchantmen, more than were taken by any other naval officer. Captain David Porter in the *Essex*, Master-Commandant W. H. Allen in the *Argus*, and Master-Commandant Lewis Warrington in the *Peacock*, however, were not far below him in numbers, and in the value of their prizes mere much above him.

During 1812-1813 the ships of war captured by our principal seagoing officers were as follows: *Guerrière*, 38, by Hull; *Macedonian*, 38, by Decatur; *Java*, 38, by Bainbridge; *Alert*, 18, by Porter; *Frolic*, 18, by Jones; *Peacock*, 18, by Lawrence; *Boxer*, 14, by Burrows; *High Flyer*, 5, by Rodgers; none, by Smith; none, by Allen; and none, by Crane. It is thus seen that the Commodore stands near the foot of the list, although none of the more fortunate officers captured more vessels than did he. Rodgers, however, did not lose a vessel during the war; while Decatur lost the *President*, Lawrence the *Chesapeake*, Porter the *Essex*, Jones the *Wasp*, and Allen the *Argus*. The Navy Department ascribed Rodgers' failure to engage a ship worthy of his metal to the want of opportunity, and much may be said for this view. It would appear, however, that the Commodore was more cautious than some of his naval colleagues, and that in one or two instances his caution led him into error and lost him a capture. It should be remembered that owing to our naval weakness it was not good policy to risk our ships in a fight unless there was a fair chance of success. The loss of a single American vessel meant the decimation of our effective seagoing force; on the other hand, all the vessels that we captured were scarcely missed by the British whose

[5] Mahan, War of 1812, II, 242.

fleet consisted of seven hundred and thirty craft. In 1813 the Secretary of the Navy wrote, "It is not even good policy to meet an equal, unless under special circumstances where a great object is to be gained without a great sacrifice. His commerce is our true game, for there he is indeed vulnerable."

In furnishing employment to the enemy's cruisers at sea, Rodgers was by all odds the most successful officer of the war. Better than any other commander, he understood the broad principles of naval strategy. His naval plans were based upon combination, concentration, and co-operation; while those of his juniors depended upon division, diffusion, and individual effort. After the department had divided its little fleet into small units, the Commodore, whenever it was possible, sailed in company with other ships in order to lead the enemy to believe that he was operating in squadron. His bold cruise to the north of England gave employment to a considerable fleet of British cruisers and received the personal attention of the Admiralty, which dispatched in search of him so distinguished an officer as Rear-Admiral Lord Amelius Beauclerk. The voyage of Rodgers' fleet in the summer of 1812 to the coast of Europe, which forced the enemy to concentrate his ships on the North Atlantic station thereby enabling our trade to reach its home ports in safety, has been referred to by Admiral Mahan in the following striking language: "Professionally, the cruise of Rodgers' squadron, unsuccessful in outward seeming, was a much more significant event and much more productive than the capture of the *Guerrière* by the *Constitution*."[1]

Services at Philadelphia, Washington, and Baltimore (1814-1815).

Soon after Rodgers, in February, 1814, completed his fourth cruise of the War of 1812, the Secretary of the Navy offered him his choice of four commands: the *President*, refitting for sea at New York; the frigate *Guerriere*, almost ready to be launched, at Philadelphia; the frigate *Java*, under construction at Baltimore; and a new seventy-four, under construction at Philadelphia. Believing that the *Guerriere* had the best chances for getting to sea at an early date, Rodgers chose that vessel. About the middle of March he left New York and went to Washington to confer with the Secretary of the Navy, stopping on his way at Havre de Grace

[1] Mahan, From Sail to Steam, 5-6.

to visit his family, which he had not seen since the war began. He now had three children, Robert S., Frederick, and John. The eldest, Robert S., was five years old; the youngest, John (the Rear-Admiral John Rodgers of the Civil War), was less than two years of age, having been born in 1812, while the Commodore was at sea on his first cruise of the war.

In 1813, while Rodgers was at sea on his third cruise, Havre de Grace was pillaged and burned by a detachment of seamen and marines belonging to the fleet of Admiral Warren. The Commodore's house was set on fire and many of his valuable articles were stolen or destroyed. His mother, wife, and two sisters (Mrs. William Pinkney and Mrs. Howes Goldsborough) fled to the house of Mark Pringle, a wealthy gentleman who liver near the village. They had no sooner reached their place of refuge, than a small division of the enemy made its appearance, having been detailed to destroy Pringle's handsome residence. Mrs. Goldsborough interceded with the officer in command, telling him that she had an aged mother in the house and begging him not to burn it. "The officer replied that he acted under the admiral, and it would be necessary to obtain his consent. Mrs. G. returned with the officer and detachment and obtained permission that the house should be spared. But when she reached it, she found it on fire, and met two men, one with a sheet and the other with a pillowcase crammed full coming out, which she could not then notice, but ran up stairs and found a large wardrobe standing in the passage all in flames. William Pinkney, who was with her, and two of the marines by great exertion saved the house. But some of the wretches after that took the cover from the sofa in the front room and put coals in it and it was in flames before it was discovered. A beautiful Madonna, which the Commodore had been offered one thousand dollars for, they were about destroying but the admiral ordered them to desist, at which they were so angry that they wrapped it up in the sofa-cover and left it as a mark of their valor."[1]

On returning from Washington in the spring of 1814, the Commodore again stopped at Havre de Grace. Here in the latter part of April he received orders from the department to take command of the *Guerriere* at Philadelphia, whither he soon proceeded. This vessel was named in honor of Hull's famous prize, the British frigate *Guerrière*. She was built by Naval Constructor Joseph Francis

[1] Niles' Register, IV, 196.

Grice. Her dimensions were: length 175 feet, beam 44.6 feet, and depth of hold 21.3 feet. Her burden was 1508 tons. She was rated as a forty-four, but she mounted fifty-three guns: thirty-three long 24's and twenty 42-pdr. carronades. Her long guns were made at the Cecil furnace near Havre de Grace, and her carronades at Dorsey's foundry near Baltimore. Her complement of boarders was two hundred men. She was launched without accident on June 20, 1814, in the presence of some fifty thousand spectators assembled on shore and on board various craft in the Delaware.

During the summer of 1814 the Commodore was employed chiefly at Philadelphia in completing his ship. Other important duties, however, fell to him at this time. Early in May he succeeded Commodore Alexander Murray, the senior officer of the navy, as commander of the Delaware flotilla, to which were transferred the crew and several officers of the *Guerriere*. Lieutenant C. W. Morgan was ordered by Rodgers to take charge of the flotilla and reorganize it, being given specific directions respecting his duties. No officer was to sleep on shore. Guard was to be rowed regularly. Each vessel was to be fully supplied with ball and powder. The cannon and small arms were to be exercised daily, the weather permitting. Lines of battle and retreat by all possible modes, such as anchoring, sailing and rowing, were to be formed. Morgan had his headquarters at Newcastle, Delaware; while those of the Commodore were at Philadelphia.

The Delaware flotilla was one of several little fleets that were maintained at the chief ports of the Union to defend the maritime frontier. It comprised about twenty small craft—gunboats, barges, galleys, block-sloops, etc. It did picket duty for the forts near Philadelphia, and also prevented the British ships from passing up the bay or sending marauding parties on shore. Although it was not strong enough to take the offensive against the blockading vessels of the enemy off the Capes, it occasionally attempted to drive some of his ships out of the bay. On June 19, Rodgers' old acquaintance, the frigate *Belvidera*, entered the mouth of the Delaware and captured a small schooner near Cape Henlopen. On learning of her movements, Morgan immediately proceeded towards the scene of disturbance, and Rodgers made preparations to join him with reinforcements from the *Guerriere*. Before the flotilla reached the lower bay, however, the *Belvidera* left it, having ransomed the schooner for eight hundred dollars.

The Commodore's presence at Philadelphia and his command of some five hundred sailors and marines on the Delaware led to his participation in the defense of the Chesapeake in the summer and fall of 1814, when the British operations in that quarter assumed great importance. In the spring our naval force on the Chesapeake consisted chiefly of a fleet of gunboats under Commodore Joshua Barney, of Revolutionary fame. In the early summer Barney established his headquarters at the mouth of the Patuxent, some twenty-five miles above the Potomac. His further passage down the bay was blocked by a strong British squadron near the Capes of Virginia. Early in 1814, Vice-Admiral J. B. Warren was succeeded in command of the British North Atlantic station by Vice-Admiral Sir Alexander Cochrane. The new commander soon began a coast warfare, undertaken partly in retaliation for outrages committed by American soldiers in Canada and partly as a diversion to prevent our government from sending reinforcements to the northern frontier.

On the night of July 11 a detachment of small craft from Cochrane's fleet appeared at Elkton, Maryland, at the head of the Chesapeake bay, and attacked a party of militia under the command of General T. M. Forman, who succeeded in repulsing the British. Expecting their return on the following night, Forman dispatched a courier to Rodgers requesting his assistance. The Commodore at once ordered Lieutenant Morgan to proceed with all haste to the relief of Forman with two hundred and fifty officers and seamen and two pieces of heavy artillery. So well did Morgan execute his orders that he marched from Newcastle to Elkton, a distance of fifteen or twenty miles, in a little less than four hours, notwithstanding the night was dark and rainy and the roads exceedingly bad. The enemy, however, did not return to the attack. The detachment of sailors, with the exception of a few that were sent to Havre de Grace to guard the Cecil furnace, soon returned to its station on the Delaware. Rodgers' zeal and promptitude on this occasion was "duly appreciated and highly approved" by Secretary of the Navy William Jones, who had now succeeded Paul Hamilton in the navy office at Washington. This incident led the Commodore to organize a corps of seamen for service in similar emergencies at the head of the Chesapeake.

About the middle of August, Admiral Cochrane, who had assembled in the lower Chesapeake, twenty vessels of war and a

large train of transports and storeships, began the movement that resulted in the burning of Washington. On the 18th a large division of his forces entered the Patuxent, and on the following day an army of forty-five hundred men, under the command of General Robert Ross, was landed twenty-five miles from the mouth of the river. On the 20th a fleet of boats, commanded by Rear-Admiral George Cockburn, ascended the Patuxent in search of Barney's flotilla, while the troops took up their march abreast of it on shore.

This ominous movement frightened our lukewarm government into taking measures for the defense of the capital. On August 19 the Secretary of the Navy ordered Commodore Rodgers and Commodore Porter (the latter being at New York) to proceed towards Washington with detachments of the sailors and marines under their command. "The enemy," he wrote to Rodgers, "has entered the Patuxent with a very large force, indicating a design upon this place, which may be real or it may serve to mask his design upon Baltimore. In either case it is exceedingly desirable to collect in our vicinity all the disposable force within reach as soon as possible. You will therefore, with the least possible delay, proceed to Baltimore with about three hundred men (including officers) of the force under your command, and also order on the detachment of marines from Cecil furnace to meet you in Baltimore where the further orders of the department await you."

The secretary sent Rodgers' orders by mail; but, owing to some "shameful irregularity in the postoffice," they were not delivered in Philadelphia until 10 o'clock a. m. of August 22. As the Commodore was spending the day at Reedy Island, fifteen miles below Newcastle, inspecting the flotilla, he did not receive his orders until 11 p. m., when he was returning to the city. Retracing his steps, he arrived at Newcastle at sunrise of the 23d, and at once made preparations to proceed southward with his men. Expecting the Commodore to reach Baltimore on the evening of the 23d, the secretary on the morning of that day sent orders to that city directing him to march to Bladensburg (five miles from Washington) with the "utmost possible celerity." As the Commodore did not reach Elkton, some fifty miles from Baltimore until midnight of the 23d he did not receive his superior's commands until too late to execute them.

By August 24 the British forces, under Ross and Cockburn, had

moved up the Patuxent, had forced Barney to burn his flotilla, and had advanced toward the capital. On the afternoon of that day they defeated the Americans under General Winder and Commodore Barney at Bladensburg, and in the evening entered Washington. Twenty-four hours later, having burnt the capitol, executive mansion and the department buildings, they withdrew from the city and returned to the Patuxent. On the 24th soon after the Americans were defeated at Bladensburg, President Madison, Secretary of the Navy Jones and several other leading officials of the government fled up the Potomac and for several days remained in hiding.

While Jones was seeking his safety in the countryside, Rodgers, who was temporarily left without orders, found employment in Baltimore, where he arrived on the 25th. The Baltimoreans were panic-stricken, believing that their city was doomed to suffer the fate that had befallen Washington. The opportune arrival of the Commodore incited their courage, and the energetic measures of defense that he at once took restored their confidence. Rodgers united his command with Porter's and with that of a small flotilla on the Patapsco, and organized the combined forces, consisting of upwards of a thousand sailors and marines, into a brigade, which he divided into two regiments, placing one under Commodore Porter and the other under Commodore O. H. Perry (the latter being stationed at Baltimore to superintend the construction of the frigate *Java*). He also conferred with General Winder and planned to co-operate with him in defending the city. The Commodore's work at Baltimore was his first experience in soldiering. Its comical aspect did not escape him. "If you were to see what a figure I cut with spurs on," he wrote to Mrs. Rodgers, "accompanied by my aides and gig-men on horseback, you'd split your sides a laughing."

Soon after the return of the Secretary of the Navy to Washington, the enemy gave the capital a second scare, this time approaching it by way of the Potomac. On August 27 a small British squadron, consisting of two frigates and five smaller vessels, under the command of Captain James A. Gordon, reached Fort Washington, a defense twelve miles below the capital on the Potomac. The officer in command of the fort abandoned it without making any resistance, and Gordon proceeded to Alexandria (seven miles from the seat of government), which place, together with twenty-

one vessels and a large quantity of stores, fell into his hands on August 29. Gordon remained here three days loading his ships with the captured booty. On receiving orders to join his admiral, he set sail down the river, but was detained by adverse winds near Fort Washington.

Gordon's movements greatly alarmed the Secretary of the Navy, and caused him to take measures for the defense of the capital, fearing that the enemy again had designs upon it. On August 29 he ordered Rodgers to proceed to Bladensburg from Baltimore with six hundred and fifty picked seamen and marines. Already, on the day previous, the Commodore had ordered Porter to march to Washington with one hundred seamen, "more with a view to guard the executive than anything else." Porter arrived at the capital on the 30th; and Rodgers, accompanied by Perry, at Bladensburg on the next day. On the afternoon of the 31st the Commodore and the Secretary of the Navy conferred together and agreed on a plan for harassing the retreating enemy. Each of the three commodores was assigned special duties. Porter was to dispute Gordon's passage by means of some batteries, which he was ordered to erect a few miles below Mount Vernon, on the Virginia side of the Potomac, at a place called White House; Perry was to operate against the enemy from Indian Head, Maryland, some ten miles below White House; and Rodgers was to annoy the retreating fleet in the rear with fireships.

It should be said by way of explanation that fireships were made by loading old hulls with inflammables and were designed to set fire to vessels by direct contact with them. Rodgers improvised his means of destruction at the Washington navy-yard. On the morning of September 3 he proceeded down the Potomac in his gig, closely followed by his miniature fleet consisting of three fireships and four barges. The latter were manned by about sixty seamen, armed with muskets. The principal officers accompanying the expedition were Lieutenants Newcomb and Forrest, Sailing Master Ramage, and Master's Mate Stockton. At Alexandria, finding no colors displayed, with the exception of a Swedish ensign on board a schooner, the Commodore ordered the American flag to be hoisted. When within half a mile of the enemy, who was discovered at anchor near Fort Washington, the fireships were ignited and set adrift. They floated down stream

towards the British fleet. But owing to the failure of the wind and the prompt efforts of the enemy's row-boats, which met the fireships and towed them away from the fleet, they did no damage. Several of the row-boats pursued Rodgers' barges and forced them to retreat up the Potomac. On reaching Alexandria, the Commodore took possession of the town, and made preparations for its defense by mounting some cannon on the wharf and by organizing a company composed of his sailors and a detachment of Virginia militia. As Gordon had left behind him a considerable quantity of stores ready to be shipped, it was feared that he might return to the city.

On the 4th Rodgers ordered Lieutenant Newcomb to proceed down the river with a flotilla, consisting of four barges and a lighter, and attack a bombship of the enemy that lay near Fort Washington. On approaching the bombship, Newcomb discovered that a British frigate was anchored close by, and he was compelled to abandon the expedition. After reconnoitering the British vessels for some time, he took a position on the Maryland side of the river, hauled the barges on shore, anchored the lighter, and stationed the bargemen on a high cliff. At 11 p. m. he was attacked by several of the enemy's boats, and after engaging them for about twenty minutes forced them to retire. On the morning of the 5th the barges again approached the British fleet, which was then retreating down the river, and set adrift another fireship; but, as on the previous occasion, the enemy was not harmed and his boats forced the barges to retreat. This incident ended the Commodore's operations on the Potomac.

Porter's forces comprised a detachment of sailors and marines and some volunteer companies of militia. For several days his batteries exchanged shots with some of the vessels of the enemy that were in advance of the main fleet. On September 5, when Gordon, taking advantage of a favorable wind, ran past White House, Porter engaged the enemy for more than an hour before the heavy guns of the two British frigates compelled him to abandon his batteries. Porter lost twenty-nine men, killed or wounded; the loss of Gordon was probably about the same. On the evening of the 5th, Commodore Perry at Indian Head engaged the British ships for an hour, at the end of which time he retired, having one man wounded. The total loss of the enemy during his retrograde movement down the Potomac was seven killed and thirty-five wounded.

While these events were taking place on the Potomac, the fleet under Cochrane was preparing to move up the Chesapeake and attack Baltimore. On September 3 Secretary Jones, becoming anxious for the safety of that city, ordered Rodgers to return to it at once, since his immediate presence there was necessary to forward the preparations for its defense and animate its citizens, "who," Jones wrote, "rely with perfect confidence upon the efficiency of your force and upon your individual influence, skill and industry." A division of the Commodore's command left straightway for the Patapsco, and it was soon followed by the remaining divisions and by the detachments of Porter and Perry. The following note taken from the *National Intelligencer* describes the departure of Porter and his men from the capital on the evening of September 6: "Fourteen wagons-full of our noble seamen, the first surmounted with the well-known standard of 'Free Trade and Sailors' Rights,' the whole preceded by the Hero of Valparaiso and cheered by their boatswain's whistle, passed through this city on their way to Baltimore Tuesday evening."

On Rodgers' arrival at Baltimore he again assumed command of the seamen and marines that were assembled for the defense of the city, co-operating with General Samuel Smith, the commander of the militia, Major George Armistead, the commander of Fort McHenry, and the Baltimore Committee of Vigilance and Safety. Through the Commodore's efforts the channel of the Patapsco on both sides of Fort McHenry was obstructed by the sinking of old hulks. For a week before the arrival of the British he worked indefatigably, building breastworks, planting batteries, and drilling seamen. He spent much time on horseback visiting his widely-separated commands. His aides were Master's Mate R. F. Stockton, who later became distinguished for his operations on the California coast in the war with Mexico, and a Mr. Allen, a brother of Captain W. H. Allen who was killed in the action between the *Argus* and *Pelican;* and his principal officers were Master-Commandant Robert T. Spence, Lieutenants Thomas Gamble, Solomon Rutter, Henry S. Newcomb, Solomon Frazier, and Joseph L. Kuhn (of the marines), and Sailing Masters Webster and Rodman. Porter returned to New York soon after his arrival in Baltimore, and Perry, owing to illness, did not receive a command.

Rodgers' sailors, though fearless and eager for a fight, were rather awkward on their land-legs. Each day they were put

through a series of military maneuvers, an exercise whose humorous incidents they greatly enjoyed. An observer of one of their drills relates that the commanding officer had much difficulty in preventing his ranks from crinkling into half-moons. In conformity with sea practice, the sailors would reply audibly to their orders. "Attention!" the officer would exclaim. "Aye, aye, sir," came from every man. That the order "to charge" might be understood by his sailors, the officer explained that it was the same as "to board." "Here they were at home. Their eyes glistened. Every fellow gather up his sinews to his utmost strength and waited with profound silence for the word. It was given, and on they came with fearful impetuosity, every one striving to get foremost. It happened that a horse and cart was in the way. Several of the spectators had retreated behind it. But the sailors came jumping over it like squirrels, and dashing among them, made them fly off at full speed to the great delight of the seamen and amidst peals of laughter from all that were looking on. Never, perhaps, since time began was there a more efficient body of men than the crew, as seamen. Nor did it appear possible that as sailors they could be better drilled to the business of a ship. But as soldiers, except in courage that knew no fear and zeal that anticipated no check, they were the queerest and most odd set of fellows that ever were collected together."

Baltimore is most accessible from the Chesapeake by way of either Patapsco neck or the Patapsco river. Patapsco neck is a narrow body of land, about fifteen miles long, lying between the Patapsco and Back rivers. The Patapsco river lies to the southward of the neck, and extends from the city towards the bay in an east-southeasterly direction. The upper part of the river consists of a northern and a southern arm, called, respectively, the Basin and the Ferry Branch. The two arms unite about two miles and a half from the city. On the apex of land formed by their confluence is situated Fort McHenry, the chief defense of the harbor. In September, 1814, the fort was occupied by about one thousand men, under the command of Major George Armistead, of the United States Artillery. The city of Baltimore lay at the head of the Basin. The principal land defenses, consisting of intrenchments, redoubts and batteries, were hastily constructed on the hills about a mile to the eastward of the city, and were designed to stop the enemy advancing by way of Patapsco neck.

The major part of Rodgers' force was stationed on the Patapsco. A fleet of twelve small naval craft, manned by about three hundred and sixty men and commanded by Lieutenant Rutter, guarded the entrance to the Basin. East of Fort McHenry, on the opposite side of the Basin, at a place called the Lazaretto, there was a battery in charge of Lieutenant Frazier. The water battery of the fort was commanded by Sailing Master Rodman. A mile to the rear of the fort, at the head of the Ferry Branch, were Forts Covington and Babcock, which formed the second line of defense for the harbor. They were commanded, respectively, by Lieutenant Newcomb and Sailing Master Webster. The minor part of Rodgers' force, consisting of about two hundred seamen and marines, manned several batteries on Hampstead or Loudenslager's hill, to the eastward of the city. It was here that Rodgers had his headquarters. The principal battery, known as "Rodgers' Bastion," was in charge of Lieutenant Gamble. Its site is now an historic spot in Patterson Park, Baltimore. The old earthworks are still well preserved, and in recent years they have been given a warlike appearance by mounting on them some ancient cannon.

On September 11 the British fleet arrived at the mouth of the Patapsco. On the morning of the 12th its commander, Admiral Cochrane, having planned to attack the city simultaneously by land and water, disembarked some four thousand men, under General Ross, at North Point on Patapsco neck, about fourteen miles from Baltimore. Having advanced about five miles, Ross encountered a division of the American army, numbering some thirty-two hundred men and commanded by General Stricker. A spirited action now took place, which resulted in the defeat of the Americans, though they suffered less than the British. General Ross was killed. His successor, Colonel Arthur Brooke, camped for the night on the battlefield, and on the morning of the 13th resumed the march towards Baltimore. Owing to the obstructions placed in the way of the British army by the retreating Americans, it did not come in sight of the city until evening. Forcibly impressed by the formidable defenses that met his view, Brooke, decided not to advance farther until he received news from the fleet, which was to support him.

Soon after landing the troops on the morning of the 12th, Admiral Cochrane sailed up the Patapsco river. At daybreak of the 13th five bombships and a rocket-ship began to bombard Fort

McHenry, at a distance from the fort of about two miles. They were supported by several frigates and sloops placed in their rear. Armistead and Frazier immediately opened fire upon the enemy; but, finding that their cannon balls fell short, soon ceased firing. In the afternoon four of the bomb-ships came within range, and the Americans resumed their fire and forced them to retire, slightly injuring two of the vessels. All day and night Cochrane kept up an almost incessant bombardment. He was unable, however, to do much damage to the fort, which lost only twenty-eight men.

At 1 p. m. of the 14th the British sent twenty armed boats up the Ferry Branch. As the night was exceedingly dark, about half of them lost their way and had to return. The rest passed by Fort McHenry without being seen. On nearing the head of the branch, their advance was arrested by Rodgers' sailors at Forts Covington and Babcock. When the enemy's headmost vessel began firing, Lieutenant Newcomb, the commander of Fort Covington, returned the fire, and was soon joined by Fort Babcock. "The darkness prevented our distinguishing his force," Newcomb wrote in his official report of the engagement. "One bomb-vessel was this side the Point, a schooner about half-way between her and Fort Covington, and the barges (number unknown throwing 12, 18, and 24-lb. shot) abreast of us. Our fire was directed at the headmost. A few broadsides checked their advance, when they concentrated nearly abreast of us and continued their attack on the batteries. The decided superiority of our fire compelled them to retreat, when they were met by a fire from Fort McHenry, which, however, from the darkness of the night was soon discontinued." One of the enemy's barges was sunk, and several men were killed.

On the morning of the 14th the British vessels, having made no impression upon Fort McHenry and the supporting batteries, discontinued the bombardment, weighed anchor, and stood down the river. On the previous night Cochrane had communicated to Brooke the failure of the fleet and the impossibility of its aiding the army, and the two commanders decided that under these circumstances an attack on the land defenses was not feasible. Brooke therefore returned to North Point with his troops and embarked them on board the vessels of the fleet. In accounting for the failure of his expedition, Cochrane laid much stress upon the barrier of vessels sunk by Rodgers at the mouth of the Basin, saying that, had it not been for these obstructions, he would not

have let go an anchor until he had attempted to pass Fort McHenry and enter the harbor.

During the advance of the enemy, Rodgers, it would seem, remained at Hampstead hill in close proximity to his batteries there. By means of his aides he kept in communication with his detachments on the Patapsco. For a time he practically directed the first regiment of Maryland militia, which was formed in column in the rear of his batteries on the hill; and a battalion of Pennsylvania riflemen, under Major Randall, which he ordered on the night of the 13th to march to the Lazaretto and dislodge a party of the enemy. Stockton, who accompanied the battalion, reported on his return that the major and his men displayed great "zeal and gallantry" in the performance of their duties. The Commodore in his official letter to the Secretary of the Navy describing his work at Baltimore wrote in complimentary terms of all his commanding officers, praising especially Newcomb, Webster, Frazier, Rutter, Rodman and Stockton. He said that Commodore Perry, although indisposed and worn with fatigue, came to the defenses at Hampstead hill when the British were approaching and offered to render every assistance in his power.

Rodgers' services to Baltimore during those anxious days when the city was menaced with destruction, were long held in grateful remembrance by her citizens, some of whom were wont to ascribe the preservation of their lives and homes largely to his efforts. More than once General Samuel Smith expressed his appreciation of the important services rendered by the Commodore and his seamen. In his general orders to his army, Smith said, "It is with peculiar satisfaction that the commanding general seizes this opportunity of acknowledging the very great assistance he has received from the counsel and active services of Commodore Rodgers. His exertions and those of his brave officers and seamen have contributed in a very eminent degree to the safety of the city and should be remembered with lively emotions by every citizen."

After the close of the war, the council of Baltimore tendered the Commodore a vote of thanks. Editor Hezekiah Niles presented him with a complete set of Niles' Register, "fancifully bound in the very best and most substantial manner." The leading citizens of Baltimore expressed their appreciation of the services of their fellow-Marylander in defending their city by giving him a handsome

silver service of plate, consisting of fifty-two pieces and costing four thousand dollars. The service was made in Philadelphia and was "splendidly ornamented with borderings and embossed figures after the manner of the Egyptian and Grecian sculpturings." Each piece bore the inscription, "Presented by the citizens of Baltimore to Com. Rodgers in testimony of their high sense of the important aid afforded by him in the defense of Baltimore on the 12th and 13th of September, 1814." It was presented to him on the third anniversary of the bombardment of Fort McHenry and the battle of North Point. A brigade paraded on Hampstead hill, and a dinner, attended by Rodgers and Armistead, was given at the fort. The Commodore wrote ex-Secretary of the Navy Robert Smith, who was chairman of the committee charged with the purchase of the gift, a modest and grateful letter of acknowledgment, from which we quote the following paragraphs:

> The elegant service of plate with which the citizens of Baltimore have been pleased through their committee this day to authorize you to present to me in testimony of the estimation with which their kindness has led them to view my feeble services in the defense of their city on the 12th and 13th of September, 1814, in repelling the combined attack of a powerful British fleet and formidable British army, is flattering to my feelings beyond my powers of language to express.
>
> That the brave officers, seamen and marines whom I had the honor to command on that occasion did every thing in their power for the defense of your city which the peculiar nature of the service and their limited means would allow, is most true; and that their hearty co-operation and best feelings were united in its cause to those of your own gallant militia is equally certain. But, in receiving so flattering a testimonial of individual respect, I am constrained, by a sense of justice and a recollection of the prompt and judicious preparations of Major-General Smith, on whom the chief command devolved, and of the gallant conduct of the Baltimore militia forming the brigade of General Stricker which met the enemy in advance, added to the laudable zeal and determined perseverance of all others with whom I had the good fortune to be associated, to acknowledge that I ought to attribute this particular mark of the favor of the citizens of Baltimore rather to that patriotism and those generous feelings for which they have always been conspicuous than to any positive claim which the occasion gives me to so distinguished a token of their kindness.

Soon after the British retreated from Baltimore, Rodgers, acting under the orders of General Smith, assumed command of Fort McHenry, as Major Armistead was too sick to remain longer at his post. The Commodore was in charge of the fort for only a few days—long enough, however, to perform one interesting duty,

the ordering of a salute to be fired in honor of Commodore Macdonough's victory on Lake Champlain. On September 19 Secretary Jones, fearing that the British would next move on Philadelphia, directed Rodgers to return at once with his seamen and marines to the Delaware. On the next day he collected his men and began his march northward. He arrived at Newcastle on the 23d, after an absence from his station of one month.

During the rest of the fall and the early winter the Commodore was employed in equipping the *Guerriere* and superintending the work of the Delaware flotilla. In December he purchased the brig *Prometheus*, which was to serve as a tender to his ship. In January, 1815, he relinquished the command of the flotilla, and visited his family at Havre de Grace, expecting soon to go to sea. The ice in the Delaware, however, delayed his sailing. Early in February news of the signing of the treaty of Ghent arrived in the United States, and the war was at an end. Already the Secretary of the Navy had the Commodore in mind for an important administrative office in Washington, but that is another story.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE TORPEDO SERVICE OF TODAY AND OF TOMORROW.

By LIEUTENANT PAUL FOLEY, U. S. Navy.

1. Day by day it grows more apparent that the spot-light of service attention will shortly focus upon the torpedo service. It is the inevitable consequence of the expansion of the commissioned personnel to an extent permitting the minds of men to seek their natural bent in various fields of specialized professional endeavor; of the approaching completion of large sea-going destroyers; of submarines of correspondingly large displacement and radius; of the establishment of the Charleston base; and finally of the advent of the parent ship, both surface and submarine. Because of these facts, an examination of the torpedo service as it is today, and as it may be tomorrow if we take full advantage of opportunity, may be considered as timely and to some extent interesting.

2. During a period of ten years, officers in our own and foreign service have independently investigated particular phases of the art of torpedo warfare. The consensus of professional opinion today, as expressed by these writers, seems to be that the submarine will shortly usurp if it has not already usurped the field formerly occupied by the small torpedo-boat; that the first field of the destroyer is on the scouting line; and that the torpedo armament of such vessels is in a measure of secondary importance, carried only in the hope that it may be of service in case of opportunity more or less remote. The question of type of scout, that is whether the destroyer class shall be abandoned entirely in favor of a vessel of larger displacement, say a *Chester*, is one on which professional opinion has not yet crystallized. The trend of opinion in our service, as expressed by the recommendations of the General Board, is distinctly toward the destroyer; and from our point of view there is much to commend this policy.

The most satisfactory scout that the mind of the naval architect can conceive and the American dollar produce, is comparatively useless unless the type which it represents be constructed in sufficient number. Numbers are essential. It is a mere matter of mathematics to demonstrate that the scouting force necessary to screen a fleet of sixteen battleships should number twenty-four vessels. It follows that the cost and therefore indirectly the size of the scouting unit should be reduced to the lowest possible point consistent with accomplishing the purpose required, which is that of being sea-going, and sea-keeping. Considered from this point of view the destroyer type is most appealing. Compare on this basis a *Chester* with a *Lamson,* one of our twenty new destroyers. A *Chester,* costing three and a half million dollars, absorbing in her complement three hundred and fifty men and twelve officers; and a *Lamson,* costing eight hundred thousand dollars, absorbing a hundred men and three officers. As long as the *Lamson* is large enough and staunch enough to be sea-going and sea-keeping her value on the battle line is equally as great if not greater than that of the *Chester.* The comparison is three to one or more in favor of the destroyer. We already have twenty *Lamsons* in being, but twenty *Chesters* are not even in the offing below the water-line. A further point that bears on this question is the wonderful stability of vessels of the torpedo-boat type both large and small, and their ability to keep afloat in spite of the most serious injury. Instances of this are the collision of the *Uncas* with the *Talbot* in Key West during the Spanish War; that of the *Olivette* with the *Lawrence;* of the *Shubrick* on Thimble Shoal; and many cited in "Before Port Arthur in a Destroyer." Whatever chance for successful torpedo attack these vessels ever possessed, they still possess in no less degree. The question of the value of the torpedo as a weapon of war has nothing whatever to do with their development as scouts; and the fact remains that we are building twenty, and that shortly we must face the problem of their employment.

3. At the inception of a torpedo service in our navy commensurate with its tonnage, and with present-day needs, there is at hand available to any one who cares to take the trouble to obtain it, a wealth of information much greater than commonly supposed; and which cannot fail to be of tremendous utility to an enterprising officer. Certain it is that the problems of the heavy ship are nowhere presented in print in such clear cut perspective. The

Manual for the Mobile Defence, compiled by Commander C. C. Marsh while the *Yankee* was stranded on Hen and Chickens Reef, and which has been approved for publication by the General Board, is a digest of every report submitted to the Navy Department during the last decade. It is essentially a book of details, intended to enable newcomers in the torpedo service to begin where their predecessors have left off. Therein are outlined plans for the organization of the force built and building into fleets and flotillas; practical working rules for classification for yearly efficiency; all the necessary details of commissioning for the individual command; instructions for the care and preservation of boats in commission and reserve; the equipment of the parent ship; and the basic principles of tactics of the boat and of the flotilla; all this both for the surface boat and the submarine. The Manual was completed about two days before the *Yankee* sank. Four copies had been prepared, one of which reached the Navy Department. The remainder, together with all the rough notes and reports from which they had been compiled, lie beneath the waters of Buzzards Bay. The early publication of this Manual is most desirable, for in no other way can the purpose and scope of the Mobile Defence be so comprehensively presented to the service at large.

Other interesting and instructive pamphlets, discussing particular phases of the torpedo question, are: "Automobile Torpedoes, Their Use, and Probable Effectiveness," by (then) Lieutenant L. H. Chandler; "Blank Torpedo Shooting," by Commander Dahl, of the Norwegian Navy; "Tactics of the Torpedo, from Notes on the Tactics of Ships," by Captain May, of the English Navy; "Useful Curves, Scouting and the Torpedo Danger Area," by Knapp Logan, and lastly "Torpedo Firing at Moving Targets," by Professor Alger.

4. The operation of torpedo vessels, large or small, on a self-sustaining basis has always been recognized as a makeshift, and their operation either from a fixed base or from a mobile base, that is a parent ship, contemplated. The idea of the fixed base is still in embryo, and by reason of its enormous cost and general impracticability will probably always remain so; but that of a mobile base became an accomplished fact with the commissioning of the *Yankee* in the summer of 1908, and is still a fact with the detail of the *Dixie* to this duty. The brief career of the former vessel

before she laid her nose on Hen and Chickens Reef, while engaged in the discharge of her duty, was full of incident and action. It almost immediately became apparent that the parent ship offered possibilities for future usefulness that were very great. In every problem of maneuver, search or attack, the parent ship served as the target. The solution of that problem becomes not merely theoretical but real. The torpedo flotilla becomes at all times a self-sufficient, self-sustaining military unit, an adjunct to, but not dependent on, the battleship fleet. As a supply ship, the parent ship satisfies the physical needs of the flotilla; and as a target it satisfies the tactical needs. One seems quite as essential as the other.

Ten years ago, when the idea of the parent ship first appeared in print, its functions were tersely described as a vessel carrying "Oil, waste, spare parts, et cetera." The "et cetera" proves to be the biggest part of the problem. A very limited consideration will make it clear that any vessel that can be a real supply ship to a flotilla of twenty or more torpedo-boats, and by a real supply ship is to be understood one that can meet every reasonable demand of that flotilla in the matter of supplies, of repairs, and of conveniences for extended periods of time, must herself be a very large vessel, a very much larger vessel than first thought might suggest. Among the more essential characteristics would be included, in the approximate relative order of their importance: 1. A sustained cruising speed of fifteen knots, and a steaming radius at that speed equal to that of the battleship fleet, which happens also to be that of the sea-going destroyers. 2. Deck room and head room sufficient for the installation of a modern machine shop, including a Thermit welding plant. 3. A naval supply fund store room. The best idea of the extent of the naval supply fund in the *Dixie* is conveyed by the statement that it numbers over nine hundred separate items, aggregating in value twenty-five thousand dollars. 4. A fresh water capacity of at least one hundred thousand gallons, and an evaporating plant sufficiently large to keep the supply replenished. 5. Store room, cold storage, clothing, and dry provision space sufficient for one thousand men. 6. Additional store rooms in which each vessel can place the spare parts of machinery, etc. 7. Magazine space for the storage of spare torpedoes, war heads, spare ammunition, etc. 8. Baking capacity of about eight hundred loaves of bread daily. 9. A flush side permitting wharfage of

boats without danger of bilging on projecting mooring shackles, sponsons, scuppers, etc. 10. Steam, electric, and fresh water connections at each side.

5. Vessels of the *Dixie* type meet in themselves, with practically no expenditure of money, almost all the above outlined requirements. With the exception of the machine shop, the alterations necessary are of a very insignificant character, such as the fitting of store rooms, the eliminating of superfluous boats, modification of gangways, etc. If at this day and date, the construction of a model parent ship were undertaken, it would work out to all intents and purposes as a double bottom *Dixie*.

In the eyes of many officers this type of vessel looms large on the horizon for use as a possible transport, in fact as indispensable in this connection. This is more for the reason that transports have always been, while parent ships are new, than for and other. With the completion of the *Vestal* and the *Prometheus*, the salvage of the *Yankee*, and the purchase of the *Shawmut* and *Tremont*, the importance of any one vessel as a transport will grow steadily less and ultimately will be lost entirely. Even at this day and date, and if we did not have a single other transport available, it may be doubted if a vessel could possibly be assigned to duty making more directly for progress and efficiency on the battle line than the parent ship. Transports and transportation are matters of dollars and days, but parent ships are of slower growth, and represent thought. Better indeed were it to have no parent ship at all than to have one which in the midst of important duty, and just when the flotilla has become adjusted to the changed conditions, is detached to haul a draft of men hither and hence; it is a more fatal blow to interest and enthusiasm and efficiency than the old problem of the battleship and the flower show; worse, because it is undignified.

6. The possibilities of the parent ship are many and interesting. Torpedo-boats may lie alongside, affording their crews facilities for washing, bathing and physical exercise. Officers, petty officers and men could stow their spare clothing on board; rest and quiet for men on the binnacle list is secured. The ship's canteen is available, the ship's barber also. These little things in themselves mean all the difference between comfort and discomfort. The ship could be made in effect a floating school of instruction for officers and men. All newcomers should be ordered first to the

parent ship, there to take a course of instruction along the following lines: 1. The literature of the service, pamphlets relating to torpedoes, torpedo craft tactics, and torpedo warfare; with particular reference to May's "Tactics of the Torpedo," and the Knapp Logan "Useful Curves." 2. An examination of the plans of all torpedo craft, built and building, their points of similarity, their idiosyncrasies, and relative degree of usefulness. It will be appreciated that the individual would find it very difficult, if not impossible, to become conversant with the above elsewhere than on a parent ship where particular pains would have been taken to get it together. Literature of this type is not found floating around promiscuously, though its importance is not open to question. This would be followed by a course of instructions on official correspondence; the details of management of the captain's office; of the executive officer's office; and of the ship's department; the operation of the lowly typewriter and other work of similar character. An examination of the use, cost price, and trade name of every article in the navy supply fund would be of particular value. Special order number 10, placing the torpedo-boats on a cash allowance for maintenance, makes it necessary to know not to use "boot topping" at three dollars a gallon, when red lead paint at thirty cents a gallon would do just as well. A supplementary course on the Bliss-Leavitt, Whitehead, and Weymouth torpedoes would be of value, and a course in mines and countermines. In the future it would seem that a very important duty of the flotilla would be to lay mines furnished by the heavy ships. All torpedo crews should be expert mine layers. The defence of the parent ship might some time be best brought about by anchoring behind a temporary mined field. As far as practicable the crew intended for new torpedo craft should be assembled on the parent ship instead of on receiving ships. There under the eyes of interested officers the preliminary instruction of the gun crews could be carried on, and the men would gradually absorb the atmosphere of the flotilla. One of the most difficult prejudices to break down is the old idea of the torpedo-boat and the "White Ship," the idea that the parent ship is a thing apart from the rest of the flotilla.

7. No parent ship other than the *Dixie* will be required for surface torpedo craft for a long time. The gunboat *Castine* has been converted into a parent ship for the submarines already in

commission. And during the time that the *Yankee* was on the rocks detailed plans looking toward the conversion of the colliers *Marcellus* and *Hannibal* into parent ships for the submarines approaching completion were prepared. Accommodations for twenty officers, two hundred and fifty men, ninety thousand gallons gasoline, dynamo plants, elaborate side moorings, lifting apparatus, and many other features were provided for. This conversion of the smaller colliers to parent ship purposes will be ample to meet the demands of the near future. In this connection it is to be noted that the parent ship for the submarines, while fulfilling all the functions of the parent ship for torpedo-boats, yet differs from the latter in that she affords a berthing space and messing space for the crews of the submarines and therefore is at all times inseparable from them. The logical consequence of this is that in the future, looking to the time when we have submarine flotillas on a large scale, we may expect a fundamental change in submarine flotilla organization. The submarine officers will no longer be ordered to duty in "Command of" submarine "X" or "Y," but to duty "In charge of." The spectacle of eight or more captains on the parent ship, each with the power of punishment, etc., strikes at the root of all military discipline.

8. It is the present intention to organize for work with the Atlantic fleet during the coming summer a flotilla of twelve boats arranged in three divisions of four boats each, with the commander of the parent ship in command of the whole as fleet commander. The basis of this enlarged flotilla is the present third flotilla, one that for several years has rendered consistently good work, as best illustrated by the fact that its vessels fly the pennants for excellence in both gun and torpedo fire. These twelve vessels, supplemented on occasion by one of the smaller colliers, embody all essential elements of a homogeneous mobile defence, the Atlantic torpedo fleet. The detail of its employment should be considered from the point of view, not whether a problem is worth while in itself, but whether it is the problem most worth while in this year of nineteen hundred and nine. The boats concerned should be considered, not as having any particular military value in themselves, but as having some military value as the forerunners of the bigger destroyers to come, which, constructed in groups of five, will be commissioned in groups of four, leaving one boat of each group in reserve at all times available to replace any vessel

disabled or injured, and thus preserving the flotilla organization intact. With the passing of the wedge formation as a steaming formation, passes also the necessity for flotillas of an odd number of boats.

9. First thought along the old lines of employment suggests the torpedo. While a torpedo-boat without torpedoes is a curious anomaly, the fact remains that the eighteen-inch Whitehead torpedo is a weapon of the past, and that the type of the future in our service has not at this time been definitely decided upon. After the flotilla has steamed back and forth from Newport to Coddington Cove; after it has spun gyroscopes, fussed and fooled, a summer will have passed. The fact, which we already know, that by the exercise of care and patience, an infinite amount of both, the Whitehead torpedo can be maintained in a fair state of adjustment will again have been demonstrated; but to what useful purpose, none.

Our thoughts turn to speed trials, to work for engine efficiency. By sacrificing two months we can no doubt again demonstrate what has been regularly demonstrated yearly for a decade, that the boats are good for sustained cruising speeds of something under twenty knots and no more. To what useful purpose this, none.

10. Some time about the fall of 1910 the naval force on the Atlantic coast will consist of three great military units, the battleship fleet, the destroyer fleet, and the submarine fleet. Conditions prevailing in the torpedo service today are largely analogous to those of the white ships of yesterday when the ambition of every captain was to get as far from the fleet as possible. To progress from this condition of inefficiency to one of substantial efficiency in the least practicable time, it is essential to keep the relative importance of problems constantly in mind, to realize that a question —the question of a torpedo for example—while of undoubted importance in itself, may properly belong to a later stage of the development of the service and not to the present.

The fundamental problem of flotilla organization is the mobile base—the parent ship. At any cost to individual inclination or personal discomfort, the flotilla should be kept away from docks. Their only wharf should be the side of the parent ship until the organization of that vessel is completely worked out; until the various problems of fresh provisions, the modification, if any, of Special Order number 10, and others of similar character

are settled forever. The spirit of the whole organization should be, not does the proposition work, but what should be done to make it work. An efficient mobile base is a tremendous military asset. It spells the difference between mobility and immobility in time of war; and a whole summer if necessary spent in perfecting its details will be time well spent.

The second problem of the hour is the development of flotilla attack, and of scouting. It is a problem of sufficient importance to warrant the absolute sacrifice of gun and torpedo practice for this summer; and of sufficient importance also to warrant the employment of the smaller vessels along lines that more properly belong to the new destroyers, since the crews of the latter will probably be evolved from those of the former. By day and by night the flotilla should attack the parent ship, both at anchor and underway. The entire time devoted by the fleet to preparation for target practice should by the flotilla be devoted to work with the parent ship; always at speeds that render probability of breakdown small; that is at speed somewhat less than twenty knots.

The daily charts of the *New York Herald* showing the position and approximate time of arrival of incoming steamers offer material for search problems capable of indefinite variation. What more useful occupation can be found for a flotilla than that, at a predetermined time, it should meet a predetermined ship at a predetermined place? If that predetermined ship happens to be the *Lusitania*, with a thousand or more cabin passengers, the chase is no less interesting.

11. Most schemes of employment fail because they are too ambitious. Three days a week of work such as has been outlined here is as much as any flotilla of boats, each with a handful of men and two officers, can stand without losing interest; and when the men lose interest the work lags, and the boats run down. Having three days for work, Thursday and Friday for cleaning, coaling and repairs, and Saturday and Sunday for rest and recreation, the summer work reduces to a definite number of days, approximately thirty-six, to each of which should be assigned a definite problem for solution. It only remains to connect the day with the deed.

12. In the fall of 1909 the great problem will be the development of the Charleston base. And in view of the fact that a large number of officers are probably not even aware of the assignment of all torpedo craft to that yard, it may be well to indicate some of

the reasons which led to its selection, and to briefly outline the future planned for it.

Charleston is intended as a repair base and not in any sense of the word as a maneuver base. Torpedo repair work is essentially specialized work, specialized not only in the sense of requiring skilled mechanics, but also in the sense of requiring a different grade of material from that in ordinary use for ship's work. The practice of practically every navy yard in the past has been to take up such work only when work on the larger vessels was slack. The consequent record of navy yard cruises of the flotilla, "awaiting material" is something appalling. The torpedo-boat *Bailey*, completed in 1900, made one trip from New York to Port Royal and returned, and has since been continuously under repairs; nine years, one torpedo-boat, and a good one. The torpedo flotilla of tomorrow must be under repair when the battleship fleet is under repair. Twenty destroyers, each two hundred and eighty feet long, require a dock space of fifty-six hundred feet, over a mile—disregarding submarines, parent ships, and the entire reserve flotilla of some twenty-five boats. There is not a single navy yard in the country offering dock space alone, let alone the possibility of handling the work in addition to that of the heavy ships. Philadelphia, Norfolk, Charleston, all were considered. Philadelphia, offering the advantage of dock room and fresh water, is a hundred miles from the sea and in winter blocked by drift ice that would be fatal to any torpedo-boat ever built; Norfolk is handicapped for dock space besides being swamped with work, the record of the *Bailey* being the record of Norfolk. On the other hand Charleston, offering deep water and dock space for every type of ship, unencumbered by any troublesome problem of organized labor, with an equable climate for eight months of the year, was at hand, built and unused, and those best in position to judge seem to be unanimous in the opinion that ultimately it will prove a very farsighted selection.

13. Appropriate problems for solution during the winter months are those of torpedo repairs, launching tubes, the navigation of the inland passage, and others of like character. The conversion of the colliers *Marcellus, Hannibal* and *Sterling*, two into submarine parent ships, and one to an oil fuel collier, cannot well be deferred to a later time than the winter of 1909, without severely handicapping the summer work of 1910. It is not practicable to

outline the work farther in advance than the summer of 1910. The point is to see the objective clearly. Once the problem and the relative importance of things are outlined in proper perspective, the evolution of an efficient destroyer flotilla will be as natural as has been the evolution of the battleship fleet.

FLOTILLA MACHINE SHOP, U. S. S. "DIXIE."

ARRANGED BY

LIEUTENANT W. W. SMITH, U. S. N., U. S. S. "SALEM."

General Arrangement.—As shown on blue print.

Lighting.—The lighting should be sufficient for work at night and on dark days. Good work cannot be done without good light. All light should be provided with switches, so that those not required can be turned off.

One large switch, located near the door, should be installed, so that all lights can be turned off.

One standing light has been provided.

Power.—All power electric. All large tools independent drive. Power switch located in dynamo room. Small tools belt drive.

Transportation.—A small truck with flat top and portable cradle for 18-inch by 21-inch torpedoes should be provided.

Chain and rope falls should be provided for lowering and lifting.

Traffic.—The shop should be arranged so that interference is reduced to a minimum and so that important places are easily accessible.

Storage.—Ample storage should be provided for so that tools and stores can be obtained quickly as soon as called for. As far as practicable there should be sufficient shelf-room, so that every article will have a place, and every tool, without having to pile them. Care should be given to the construction of bins and racks. Those who have had to practically rebuild store rooms on new ships will appreciate this.

Shelves.—Shelves should be located near all tools and benches, for tools, material, etc.

Office.—For the efficient running of the shop a good office for the chief of the shop and the store room keeper is necessary.

Tool checks.—If the tool check system is to be used, and I think it should be, tool checks and a tool check board should be supplied.

Tool Boards should be made for each lathe, as they are a great convenience.

Dirt Pans and Dirt Cans.—It is important to provide for catching dirt and having plenty of places for it. Dirt pans should be fitted under lathes, etc. Dirt cans should be located around the shop.

Benches.—They should be large and about 32 inches high.

Library.—Catalogues, descriptions of machine tools, etc., and reference books, should be provided for the use of the chief of the shop, store keeper and machinists. They will be a great help in having the work done in accordance with the best practice and also in ordering supplies, etc.

Water, Steam and Air should be piped into the shop for testing and other purposes.

Waste Cans should be conveniently located.

Wash Bowls and Lockers.—In dong fine work it is necessary to wash the hands frequently. Wash bowls are a convenience that I think should be had in a shop of any size.

Urinal.—Located near wash bowls, convenient and a time saver.

Telephone and Voice Tube.—In order to avoid delays, I think these should be put in.

Tool Steel.—All of the tool steel should be of the self-hardening, high-speed variety. Landerson's is recommended.

Patterns and Tinplate.—Heavy tough paper should be supplied for this. It is easy to lay out and cut out. Patterns once made can be marked and filed away for future use. Patterns can easily be made on a torpedo-boat when necessary. Material can be turned out from patterns on file by referring to the boat's number of the pattern.

Drafting Room.—It is very desirable to have a place on board ship for drafting work. A permanent table and board should be put in a convenient place. There should be a supply of instruments, paper, etc., for marking drawings, tracings and blue prints. This will be very valuable in planning changes and improvements in machinery.

Among the minor things, I would suggest plenty of cheap paper and lead pencils, small perforated pads for store orders, etc.

MACHINE TOOLS.

One (1) large lathe—extension gap lathe; triple-geared. Hendey-Norton recommended.

Four (4) small lathes—taper attachment, screw-cutting, cross-feed. Hendey-Norton recommended.

One (1) universal milling machine; back-geared, with supply of cutters to suit work. Brown & Sharpe, Cincinnati, recommended.

Two (2) shapers; front and down-feed, 24-inch and 18-inch stroke; as per specifications; Gould & Everhart recommended.

One (1) boring machine, horizontal. Bullard recommended.

One (1) universal radial drill.

Two (2) drill presses.

One (1) emery grinder. Double wheels. Enclosed and water-cooled.

One (1) emery grinder and buffer.

One (1) sensitive drill.

One (1) 6-foot planing machine.

One (1) Portable electric grinder, with attachments to secure on lathe carriages.

One (1) air compressor.

One (1) power hacksaw.

One (1) power combined punch and shears.

One (1) mandrel press.

One (1) pipe threading and bolt-cutting machine.

One (1) bench hand-shear and punch.

One (1) bench lathe for small and delicate torpedo work.

Supporter legs of lathes, excepting gap lathes, to be in two sections, with light apron fitted between to catch chips and dirt.

All power-driven tools to be independent electric-driven. Be careful to specify the voltage of the electrical equipment of machine tools.

TOOLS AND EQUIPMENT.

One (1) large gauge-testing outfit, or small steam pump for testing gauges and other work.

One (1) Hauk kerosene or crude oil portable burner, with tank and other attachments.

One (1) adjustable boiler flue-cutter.

Necessary sizes of boiler tube and distiller tube roller expanders. Little giant air drills and hammers. Air hose and attachments. Complete blacksmith set of tools. Anvil, sledges, tongs, etc. Complete coppersmith's set of tools, including tea kettle stake with set of steel faces, hollow mandrel stake, conductor stake, hatchet stake, blowhorn stake, bleakhorn stake, bevel stake, square stake, double seaming stake, bottom stake, creasing stake with horn, needle case stake and solid mandrel stake. Steel plate trolley with differential hoist over large gap lathe. Hoist over hatch for lowering down work and trolley running to cast-iron bed. Beam clamps, angle plates and chucks for lathes and drill presses, two boring bars for lathes. Bench plates between vises. Scales in store room for weighing material served out. Plumber's blow lamps, centering drills and countersinks, three sets of lathe dogs, also clamp dogs. Emery wheel dresser. Hand vises. Ratchets and old men.

One (1) Thermit welding outfit, as per list.

Two (2) pair vernier calipers, 6 inches by 12 inches.

One (1) vernier depth gauge.

Two (2) pair micrometer, 1 inch by 6 inches; adjustable set of same in case.

One (1) set of beam tram calipers.

Four (4) sets of steel rules or scales, from 1 inch to 12 inches.

Four (4) steel straight edges, one 12 inches and one 24 inches.

Two (2) combination sets, including square center, protractor and level (12 inches).

One (1) universal level protractor.

Two (2) universal surface gauges, one small, the other large.

Two (2) screw-pitch gauges.

One (1) set thickness gauges.

Twelve (12) 1-inch center gauges.

Four (4) standard screw-thread gauges.

Four (4) hardened steel squares, 4 inches, 8 inches, 12 inches and 24 inches.

Six (6) standard wire gauges—English.

Six (6) standard wire gauges—American.

Two (2) set standard machine thread taps and dies.

One (1) set standard pipe thread taps and dies.

One (1) set machine reamers.

One (1) set straight reamers.
One (1) set tapered reamers.
One (1) set of thread combs—stand, machine thread, inside and out.
One (1) test indicator.
One (1) set of Armstrong tool-holders for each machine.
Twelve (12) sets of ball pean hammers, ½ to 3 pounds.
Three (3) sets of cross pean hammers, ½ to 3 pounds.
Two (2) standard surface plates, one 12 inches by 12 inches, and one 24 inches by 24 inches.
Six (6) pair of outside calipers, 2½ inches (spring calipers).
Six (6) pair of outside spring calipers, 4 inches.
Six (6) pair of outside spring calipers, 6 inches.
Six (6) pair of outside spring calipers, 8 inches.
Six (6) pair each of inside calipers, 2½ inches, 4 inches, 6 inches and 8 inches.
Six (6) pair each of dividers, 2½ inches, 4 inches, 6 inches and 8 inches.
Two (2) pair inside and outside thread calipers, 3 inches by 5 inches.
Two (2) small chain falls.
Four (4) rope falls and straps.
Two (2) pairs wire cutters.
Six (6) pair plyers.
One (1) carpenter's tool chest (S. E. Standard).
One (1) pneumatic hammer.
One (1) pneumatic electric drill.
One (1) arbar brace for pressing in arbars.
Six (6) star condenser packing tools.
Two (2) Valve reseating machines.
Dirt cans.
Twenty-four (24) squirt cans.

Oil tanks; waste cans; tool check board; bulletin board; twelve vises; two small vises for fine work; one water cooler; one clock; six thermometers; six chairs; six camp stools.

Small drawing portfolios for sketches and blue prints; one for each boat; stationery, pencils and office equipment.

Store order pads and shop order pads; record books; file boards; stick files; drawing boards; drawing instruments; drawing paper; tracing cloth; cross-section paper; tracing paper; blue print paper; Van Dyke paper or cloth; blue print frame; drawing table (not in machine shop, but entered here as part of equipment of same).

Heavy tough paper for templates and patterns; pressboard for mounting machine; gear tables and instructions; paper tags for labelling work; library of catalogues and books for shop reference; tool boards, one for each lathe; shelves, see below; dirt pans, under machine tools such as lathes; wash basins; clothes-lockers and hooks; two desks, with shelves for library and supplies above—in store room.

Thirty-five (35) sets of tool checks, 10 checks for each ring.
Cast iron erecting floor—used for plate work, heavy work, etc.
One (1) rack, heavy plate storage; racks for long stock storage.
One (1) store room, tool room and office, as described below.

One (1) telephone to central or engineer officer.
One (1) voice tube to engineer officer.
One (1) steam connection; water connections as shown.
Three (3) arc lamps.
One (1) 16 candlepower standing light.
One (1) portable cleaning gear and waste locker under ladder.
One (1) switch for throwing out all lights except standing lights.

FOR STOCK AND OTHER SUPPLIES, SEE ALLOWANCE.

Attention is called to the following: Smooth-on cement; Taurie packing; Garlock "900" packing; spring steel for relief valves, reducing valves, springs, etc.; Babbitt metal; Babbitt ladles.

TOOLS FOR MILLING MACHINE.

One (1) circular table; one (1) vertical head; one (1) ply arbor; two (2) screw arbors, one right and one left; two (2) milling arbors, 1 inch and 1¼ inch; two (2) arbors for face milling cutters, with inserted teeth, 1 inch and 1¼ inch; two (2) special cutters, one for taps and one for reamers.

U. S. S. "DIXIE."

NAVAL SUPPLY FUND.

Acid, muriatic.
Asbestos, flake.
Ash boards.
Bands, rubber.
Baskets, desk.
Blades, hacksaw.
Blotters.
Bolts, and nuts, hex., mach.
Books, blank.
Brass, sheet, hard.
soft.
Brick, bath.
fire.
Bronze, rod, hex.
round.
Brooms, corn.
Brushes, paint, flat.
round.
varnish.
hard, scrub.
coir and handles.
Buckets, galv. iron.
Bunting, blue.
red.
white.
yellow.
Bushings, brass.
Candles.
Canvas, cotton.
bag.
Ravens's.
flax.
Raven's, light.
kahki.
Raven's.
Caps, brass.
Cement, Portland.
Chisels, cape.
cold.
Clips, paper.
Cloth, emery.
Copper, sheet, hard.
soft.
Couplings, brass.
Cups, sponge.
Dryer, Japan.

Elbows, brass, 90°.
45°.
Envelopes, manila.
paper.
plain.
Erasers, steel.
Eyelets.

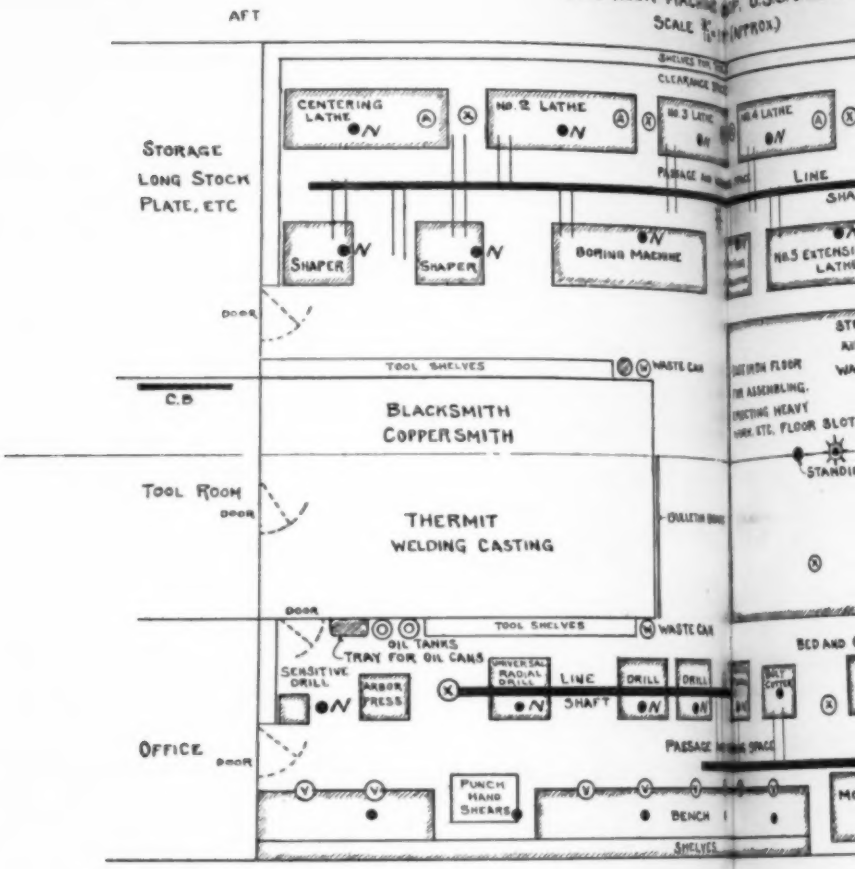
Fasteners.
Eureka.
Files.
flat, bastard.
half round, bastard.
square, bastard.
round, bastard.
flat, smooth.
round, smooth.
flat, second, cut.
slim, taper, saw.
Folders, paper.
Fuses, glass, globe.
Glass, ground, fine.
medium.
coarse.
Glasses, water, gauge.
Globes, hand lantern.
dark deck lantern.
Graphite.
Grease, Albany.
Gum, strip, for gaskets.
Halyard, signal.
Hinges, brass, f. j.
l. p.
Holders, copy, typewriter.
pen.
Hooks, boat.
cup, brass.
Hose, steam, ¾-inch.
wash deck, 1½-inch.
Iron, bar, flat.
Lamps, 16 c. p., 80 volts, clear.
32 c. p., frosted.
5 c. p., clear.
Leads, 5-pound.
7-pound.
9-pound.
Lead, sheet.
red, dry.
white in oil.
Lights, blue.
Linoleum, ½-inch.
Locks, pad, 2½-inch, with chain.
1½-inch, with chain.
2¼-inch, no chain.
Loglines, 600-foot.
400-foot.
taffrail, 600-foot.
Lye, concentrated.
Mahogany.
Manila.
Mats, cocoa.
rubber.
Megaphones, 18-inch.
Metal, antiattritian.
Mucilage.
Muslin, Turkey red.
white.
Nails, iron, cut, galv.
steel, wire.
Nipples, brass.
Oak.
Oakum.
Oars.
Oil, Arctic engine.
kerosene.
lard.
linseed.
marengine.
sperm.
Openers, No. 1.
Packing, spiral.
asbestos, sheet.
Garlock, l. p.
sheet, w. i.
hub.
Garlock, h. p. spiral.
Pads, desk.
memorandum.
Paint, aluminum.
ferric oxide.
zinc, white, in oil.
ivory drop.
chrome green.
yellow.
Paper, blotting.
note.
typewriter.
carbon.
wrapping.
oil.
sand.
Pencils, lead, black.
red and blue.
copying.
Pens, ruling.
steel.

Pins, No. 3.
split, brass.
steel.
Pine, dressed.
yellow.
Pipe, brass.
copper.
Plugs, brass.
Polish, liquid, metal.
Pots, paint.
Punches.
Putty, in oil.
Rivets, copper, boat.
Rope, wire, 1¾-inch.
Rotators, Negus, log.
Rulers, No. 7.
B. W. B. E.
Screws, brass, mach. f. h.
r. h.
iron, f. h.
r. h.
brass, wood, f. h.
r. h.
Sharpener, Gem.
Shears.
Shields, typewriter eraser.
Skins, chamois.
Smooth-on compound.
Soap, saltwater.
Solder, half and half.
Sponges, Loofah.
Stands, ink.
mucilage.
Steel, round, mach.
American tool.
sheet, galv.
Stone, rotton.
Tacks, copper, f. h.
thumb.
Tags, linen.
Tallow.
Tape, insulating.
Tees, brass.
Thermometers, ord., 0° to 212° F.
Thread, linen, red.
white.
yellow.
blue.
Turpentine.
Twine, cotton.
linen.
Unions, brass.
Valves, brass, gate, screw.
angle.
globe.
check.
cross, screw.
Varnish, asphaltum.
Damar.
spar.
Vaseline.
Venetian red, dry.
Vermilion, in oil.
Waste, cotton.
Weights, paper.
Wicking, spun, ball.
Wire, fuse, 4 amp.
10 amp.
d. c., silk.
plain.
hard brass.
soft.
copper.
lead.
Worsted, Zephyr.
Zincs, boiler.

DIAGRAM PLAN

FLOTILLA MACHINE SHOP, U.S.S. DIXIE.

SCALE 1" = 1'0" (APPROX.)



ELEVATIO

■ TELEPHONE & VOICE TUBE

● 32 C.P LAMPS

☼ ARC LAMP

N ADJUSTABLE LAMP HOLDER

Ⓐ TOOL BOARD

Ⓔ ELECTRIC SOLDERING

Ⓖ GASKET MACHINE

BENCH

STORE ROOM B
AND SHELVES

ALL MACHINE TOOL

ELECTRIC

DESIGNED

Ⓞ OIL TANKS

Ⓥ BENCH VISE.

[V] SMALL BENCH VISE FOR FINE WORK.

Ⓦ WASTE CAN

Ⓧ DIRT CAN

C.B. PORTABLE TOOL-CHECK BOARD

AGRAM PLAN

ACHINE SHOP, U.S.S. DIXIE.

LE 1/2" = 1'-0" (APPROX.)

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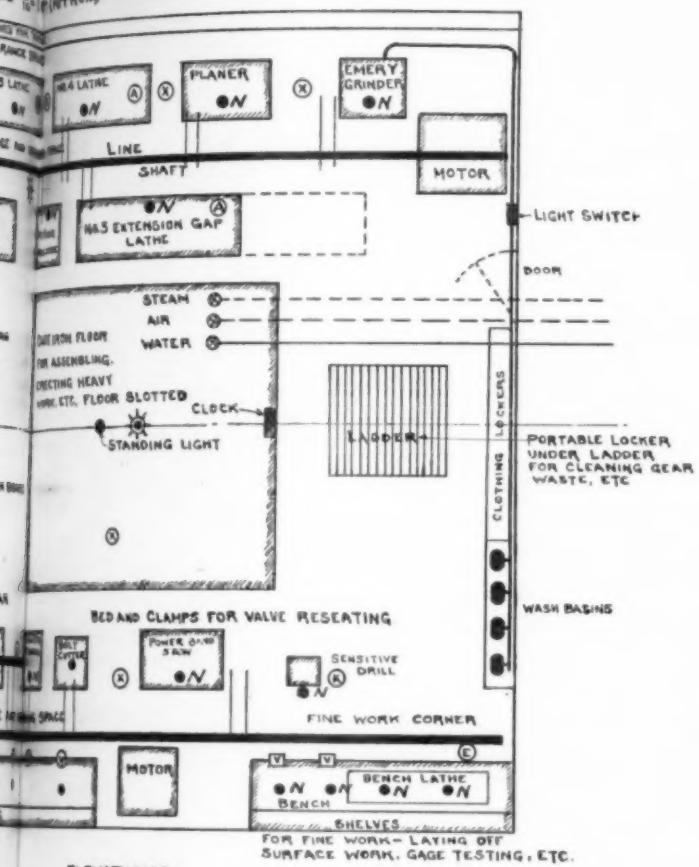

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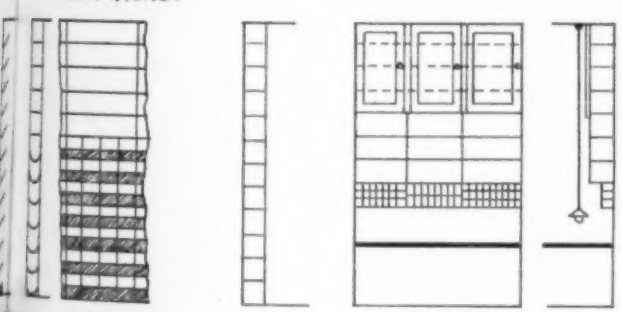

STORE ROOM BINS AND SHELVES.

TOOL SHELVES

OFFICE.

...RENT ELECTRIC DRIVE.

DESIGNED BY LIEUT. W.W. SMITH U.S.N.

U. S.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

PROJECTILES FOR NAVAL GUNS.

By HENRI BERNAY in *Le Yacht.*

Translated by PHILIP R. ALGER, *with Comments.*

The question of projectiles for naval guns is always to the fore. The experimental firings at the Iéna, which are being prepared for at Toulon, will enable us to determine some points that are still doubtful and will bring forth an official and definite view. While awaiting them, it seems an opportune moment to set forth briefly the principal facts concerning the actual situation.

The effects of a projectile striking a modern armored ship depend in the first place upon its explosive charge; they also depend upon its capability of perforating a greater or less thickness of steel before bursting; furthermore ballistic qualities must be taken account of, in so far as they depend upon the projectile, as influencing the accuracy of fire and the range at which it is efficient.

Explosive shell, whether of large or small capacity, are ineffective against armor which they cannot perforate. They must find an entrance into a structure in order to damage men or machinery within it. Bursting on the outside, they are harmless except against men in such exposed positions as to be struck by fragments. Consequently the most important requisite for projectiles that are to be fired at armored ships is ability to penetrate the armor.

Before destroying the target, it is needful to hit it. Other things being equal (range-finding instruments, skill of pointers, precision of pointing mechanism), accuracy of fire is the greater in proportion as the velocity of the projectile is higher. Great initial velocities correspond to high chamber pressures, more than 3000 kilograms per square centimeter (*about 20 tons per square inch*) in recent models. It is necessary, therefore, that the pro-

jectile be strong enough to support this pressure without exploding in the bore (which, with the melinite explosive charge, would cause the destruction of the gun and even of the neighboring personnel). Consequently there is a lower limit to wall thickness, that is to say, an upper limit to the weight of explosive charge which can safely be put in a projectile. Experience has shown that a shell whose explosive charge represents 25 per cent of its total weight will not withstand pressures greater than 1800 kilograms per square centimeter (*about 12 tons per square inch*); a shell thus charged cannot therefore be fired with precision at long ranges, at least under the conditions of naval ordnance (in curved fire, for shore batteries, reduced initial velocities are not only allowable but even advantageous).

The practical limit of weight of the bursting charges of shell for modern high-powered guns is about 10 per cent of the total weight of the shell. Even in the case of the so-called torpedo shell fired from U. S. sea-coast mortars, the weight of the high-explosive charge is less than 12 per cent of the projectile weight. The great length of shell carrying 25 per cent explosive charges would forbid their use on ships even if they could be made strong enough to withstand the strains of firing with high velocity.

Having secured a high initial velocity, the next point is to maintain it, or rather not allow it to fall off too much during the projectile's flight; if the velocity diminishes too quickly, the trajectory is no longer flat at long range and the danger space is decreased; moreover, the striking energy of the projectile suffers equally, and its perforating power is weakened. But, to maintain its velocity, the projectile must have mass; therefore the projectile to be used should be heavy, as heavy as conditions relating to rapidity of loading and supply permit. It is one of the chief errors to be charged against our naval ordnance officers that they have always sought velocity at the expense of projectile weight, a practice based upon the idea of short-range fighting and which is fatally bad now that we expect to fight, or at least to open fire, at extreme range. It is customary to compare projectile weights by means of the ratio $\left(\frac{w}{d^3}\right)$ of the weight to the cube of the caliber; this ratio, in England, in Germany and the United States, varies from 14 to 16.5; with us it is usually about 12 (exactly 12.2 for all our 30.5 c. m. projectiles in service). Shell as light as

this cannot be used as advantageously as heavy shell. There is need, therefore, that in this respect we should abandon our old customs.

The figures given (14 to 16.5) are for kilogram-decimeter units and correspond to from .506 to .596 for pound-inch units. The U. S. Navy shell designs, except in the case of the 50-pound, 5-inch shell, which was made light for special reasons, are based upon a value of $\frac{w}{d^3}$ *equal to about .5. The figure 12.2 for the French 12-inch shell makes its weight 763 pounds. The probability that future naval battles will be fought at long range emphasizes the importance of weight in projectile design. For the same reason it has recently been found expedient to alter the shape of projectiles so as to decrease the value of the coefficient of form.*

But added weight can be obtained in two different ways—by lengthening the projectile, or by increasing the thickness of its walls. Lengthening permits enlarging the capacity and increasing the weight of the explosive charge, but a long shell is not so stable in flight, tending constantly to tumble; it is true that this fault can be remedied by an increased pitch of rifling, but with grooves inclined more than 4° (the mean figure in modern practice) the rotating bands are sheared by firing with great initial velocity. Moreover, a long shell breaks up more easily than a short one upon impact with armor, especially if it strikes obliquely. One can go but a short distance in this direction.

This must be a mistake, for the French guns do not differ materially from our own and in the latter the angle of the rifling is about 7°. The tendency to wabble is greater the longer the shell, but the greatest disadvantage of the long shell is its inability to withstand the shock of impact upon armor without breaking. Moreover, length is limited by the requirement that the shell must not upset in the gun under the powder pressure on its base.

The thickening of its walls increases the strength of the shell, but leads to reduction in the explosive charge, which evidently cannot be allowed to fall below a certain minimum figure. A middle course must therefore be followed. We must depend upon experiment to determine within what limits lengthening and increasing wall thickness must be concurrently used to obtain the needed heavy shell having a ratio $\frac{w}{d^3}$ equal to about 15.

This point cleared up, the remaining problem is to determine the explosive charge to be put in the projectile.

According to the proportion of this charge to the total weight, shell are classed in definite catagories: the armor-piercing shell, of chrome steel, contains an explosive charge only just sufficient to burst it—about 2 per cent to 3 per cent; the semi-armor-piercing shell, likewise of chrome steel and capped, in our navy contains about 7 per cent of its weight of explosive; the English *lyddite shell,* like the Shimose shell which assured the Japanese victory at Tsushima, contain 10 per cent of explosive; lastly, the shell of great capacity, with thin walls and of a milder steel, has a charge which may reach 25 per cent of its weight.

As regards their action when fired against armored structures, these shell may be classed as follows: the armor-piercing shell perforates a plate of face-hardened steel a caliber thick at 8000 meters; the semi-armor-piercer perforates at the same distance a plate half a caliber thick, and bursts beyond it; the large-capacity shell will scarcely perforate a thickness of hard-faced armor equal to one-quarter of its caliber. Fired against plates a caliber thick, the semi-armor-piercing shell bursts in the plate, and produces destructive effects beyond it; the large-capacity shell under the same circumstances produces only insignificant effects.

These statements need to be qualified. Only in the case of guns of the largest caliber is the remaining velocity at 8000 meters sufficient for the perforation of a caliber of armor with normal impact. The semi-armor-piercing shell must have a very great striking velocity to produce destructive effects beyond armor a caliber thick—the burst diminishes its perforating power rather than adds to it. Under the conditions of actual warfare the best armor-piercers would very seldom get through armor a caliber thick, and the semi-armor-piercers may be considered wholly ineffective against armor three-quarters of a caliber thick.

The last style of shell long ago showed itself to be worthless against armor; the tests made in the United States in 1901 with the Gathmann shell had already proved it; these shell, which carried up to 230 kilograms of gun-cotton, would have done no serious damage to a modern battleship.

It would be more correct to say that the experiments showed that the detonation of such a charge in close contact with a heavy armor plate did no damage to the plate or to what was behind it. No such charge of explosive was fired from a gun.

Nevertheless shell thus charged might produce considerable effect if they struck the battleship below her armor belt, as a torpedo would. But it is known, ever since the Whitworth experiments of 1868, that ogival projectiles of ordinary form ricochet on striking water; to enter the water and traverse it, the shell must have a flat head; the famous P shell of our coast batteries is designed upon this principle. A ship armed with this kind of projectile might be conceived of were it not recalled that their use in low-angle fire is only permissible beyond a certain distance (that which corresponds to the angle of fall necessary to insure their penetrating the water), and that within this distance the ship in question would be practically disarmed in the presence of a ship having ordinary projectiles. The P shell are only suitable for coast batteries.

If it is true, as reported in La Vie Maritime, that the tests of the P shell against the Admiral Duperré were at 3000 meters' range, this would seem to corroborate the statement that the P shell have flat, or at least blunt, heads. With the ordinary ogival point, the angle of fall must be 12° or more to cause the projectile to enter the water to a sufficient depth to strike a ship below her armor belt.

Let us now consider the effects produced by the explosion of the charge.

The less the thickness of the shell walls and the closer their contact with the explosive, the greater the number of fragments and the greater the velocity with which they are dispersed; consequently the larger the explosive charge the more harmful are the fragments. As regards the direct effects of the explosive shock we have no precise information, the occurrences which serve as a basis for the discussions regarding them being those of the Russo-Japanese war, still but little known. At first there was a tendency to attribute to them a capital importance, and for that reason some have ardently advocated the shell of great capacity; but there was good ground for deriding the "bombardment with carbon dioxide" when it was learned that on the *Cesarevitch* at the battle of August 10, as well as on the *Souveroff* at Tsushima, the men who manned the 12-inch gun turrets were able to keep on firing after those turrets had been struck by shell of the same caliber (*Shimose shell* with 10 per cent of explosive), and even when the turret roof had been carried away. It was the wounds

caused by the fragments that put the personnel out of action, and not the asphyxiating action or the shock of the explosions; these latter effects, moreover, are only produced within a quite short distance which is only proportional to the square root of the weight of the explosive charge; they are not very different for two shell of the same weight, one a semi-armor-piercer and the other of great capacity; lastly, they are of real importance only when they occur inside a ship, and for that the shell must first penetrate, and the shell of great capacity, as we have seen, is powerless against armor.

The best information seems to indicate that the Japanese high-explosive shell were of very inferior character, breaking up on impact against even the thinnest plating, and that they did no damage at all to the armored portions of the Russian ships, their destructive effects upon the personnel being due to the Russian ships being crowded with men unprotected by armor. These shell, exploding on impact, made large holes in the unarmored sides, but if they had been fitted with delay-action fuses and had been strong enough to go through the sides whole and then explode, they would have done more damage than they actually did.

Putting aside the large-capacity shell—and there are plenty of reasons for so doing—there remain to be considered only the armor-piercing shell and the semi-armor-piercer (this latter type not being limited, be it understood, to a 7 per cent proportion of explosive as in our service model, but including shell of the English design with 10 per cent).

The theory always sustained by our naval ordnance department, and of which Mr. Chautemps was the warm defender in the Senate, is that the two shell should coexist, one for the attack of thick armor and the other for thin armor and unprotected parts.

But this is a conception which no longer finds adherents in the navy; the accuracy of fire at sea is not great enough reasonably to count upon hitting one part of a ship rather than another. Unity of projectiles is like unity of calibers, something to be aimed at, as very important from the point of view of facility of supply and of certainty in fire control. As, furthermore, the armor-piercing shell is of little efficiency against superstructures, on account of its small bursting charge, it is the semi-armor-piercing shell alone that should fill the magazines of modern ships.

While a good deal can be said in favor of supplying battleships with both classes of shell, the armor piercer and the semi-armor-piercer, the weight of the argument seems in favor of a single type. The conclusion that this single type should be the semi-armor-piercer, however, seems quite illogical. In modern battleship design all vital parts, including the personnel, are protected by armor thick enough to render anything but the best armor-piercing shell ineffective. And what is still more to the point, the damage done by the proper explosion of an armor-piercer will be almost, if not quite, as great as that done by the explosion of a semi-armor-piercer, supposing each to get inside before exploding. Contrary to popular opinion, the weight of its explosive charge is not a true measure of the destructive power of a shell. The real damage is that done by the fragments, and the weight of steel counts for more than the weight of explosive, provided only that there is enough explosive to produce good fragmentation.

The firings against the Iéna, in which there will be tested shell differing in weight, in length and in explosive charge, will for the first time enable us to determine in a scientific manner the value to be assigned to each of these elements. It is much to be wished that they be undertaken without further delay.

And it is also much to be wished that opportunity soon be afforded to test our own shell by extensive firings at armored structures at long range. However convinced we may be of the correctness of our reasoned-out conclusions, we should never be satisfied till we have experimentally demonstrated their truth.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE BAPTISM OF SHIPS.

By ROBERT G. SKERRETT.

Just once so often during the upbuilding of our modern navy there is agitation anent the particular form that the launching ceremony should take; and the special rock upon which there is a split is over the use of wine or water. There are some good souls intensely insistent, in the name of temperance, that water shall be spilled upon the vessel's bow at the time of naming, while there are others, probably unconsciously subscribing more closely to tradition, who urge with equal vim that wine shall be the element in the baptismal ceremony. Both of these partisans are more or less right, but all of them have commonly lost sight of the derivation and the real significance of the performance. The whole question is primarily a religious one, while the popular attitude to-day is one of tolerance toward a surviving superstition.

From the very beginning of primitive man's venture upon the water—perhaps because of the frail character of his craft, he recognized the risks he ran and in his superstitious awe sought the protection of the hidden powers that ruled the wind and the waves. Through all the devious paths of developing religions, early man strove to placate opposing deities and to propitiate the favoring gods who, to him, became more or less personal. As his religion became more concrete his gods took the material shape of idols, and that they might be always with him he first fashioned some part of his vessel more or less after the manner in which he pictured them, and never launched his craft until after he had made tribute by word or act to his protecting deity. Later on, his idols ceased to be the grotesque semblance of animals and demons and became benignant and human-like, and for these he made a special place within his vessel and sanctified that place of keeping.

It is quite impossible to follow chronologically the evolution of the launching ceremony, but enough can be found here and there to point to a reasonable sequence, and for a probable survival of the most ancient practices we must naturally turn to the customs still remaining among primitive peoples. Ellis, in his "Polynesian Researches" tells us that the Samoans and the Fijians used to make human sacrifices to their shark deities who ruled the waters. In Tahiti, it was the custom to shed human blood when a new canoe was built or launched. Again, Mariner, in "Tonga," tells us that men were sometimes sacrificed in order to wash a new canoe's deck with blood, and that it was likewise the practice to use men as living rollers on which to launch the craft. In this there is a strange likeness to the ancient Norse habit of attaching human victims to the rollers upon which they launched their ships; and in the Eddas this ceremony is referred to under the name of "hlun-rod" or roller-reddening. Among the Tonga islanders it is the custom to-day still to offer kava and oil to the sea gods, and in all of these ceremonies the native priest plays a conspicuous part if the ancient rites prevail. These votive offerings or oblations are still made among the primitive peoples of many parts of the world, and in this particular they show the persistent permanence with which such practices are handed down from the ages past.

So far as actual records go, the earliest account of a votive offering to the gods upon the completion of a ship dates back twenty-one hundred years before Christ, and it seems that even then man dared not venture upon the sea until he had thus propitiated the gods. On an Assyrian tablet, found some years ago by Professor Schiel, we have a Babylonian account of the Deluge and of the building of the Ark, and of the religious ceremony at its completion. Rendered into English, the story reads, in part, as follows:

> Eighthly, its interior I examined.
> Openings to the water I stopped;
> I searched for cracks and the wanting parts I fixed;
> Three sari of bitumen I poured over the outside;
> Three sari of bitumen I poured over the interior;
> Three sari of men bearers who carried chests on their heads.
> I kept a saros of chests for my people to eat.
> Two sari of chests I divided among the boatmen.
> To the gods I caused oxen to be sacrificed.

To the Chinese belongs the palm for pioneer work in breasting the tempestuous sea and in carrying their explorations into far lands—their commerce reaching at a very remote period as far west as the Persian Gulf. Probably no existing country has held with more faithfulness of detail to its ancient religious practices in most of their forms. In "A Discourse of the Navigation of the Portuguese," translated into English in 1579, is found this fairly full account of the Chinese practices at the launching of their ships: "When they launched their ships into the sea at the first making, the priests go apparelled with long garments, being very rich of silk, to make their sacrifices in the poops of them, where the place of prayer is, and they offered painted figures, and they cut and burned them before their idols with certain ceremonies that they make, and sing songs with an unorderly tone, sounding certain little bells. They worship the devil, where they have him painted in the fore-part of the ship, because, as they say, he should do no hurt to the ships. In all this discourse they are eating and drinking at discretion."

Among the Chinese these ceremonies have since undergone no substantial change, and in every large junk there is a shrine in honor of the goddess Tien-how, who is the tutelary deity of sailors. In addition to the goddess Tien-how, the Chinese sailors particularly engaged in the river traffic are devotees of the goddess Loong-moo or the Dragon's Mother. In honor of this latter deity the master of every river junk makes tribute at the beginning of a voyage. Prior to weighing anchor, he takes his place at the bow which, agreeably to Chinese tradition is the most sacred part of the ship, and there proceeds to propitiate the Dragon Mother. Before him on a small temporary altar are placed three cups containing Chinese wine or "saki." With a live fowl in one hand, the master performs the Kow-tow, and raising the cups one after the other from the altar he elevates them above his head before emptying them upon the deck by way of a libation. Next he cuts the throat of the fowl with a sharp knife and sprinkles the deck immediately about him with the blood of the sacrifice. One of the crew now presents the master with several pieces of silver paper, which in turn are sprinkled with the sacrificial blood and then fastened to the door-posts and lintels of the captain's cabin. This is suggestively like one of the rites of the Jewish Passover.

The Bible tells us of the glories of the fleets of Tyre, and history records as well much of the religious pomp and ceremony associated with the ships of ancient Egypt. The mythology of ancient Egypt is full of the part played by its deities in watching over its hardy mariners, and there can be no doubt whatever that some form of priestly ceremony and blessing was a part of the launching of the ships of the state at least, if the records of Du Sein and other historians are to be trusted. At the battle of Salamis, the Greeks went into the fight just after the conclusion of religious ceremonies, which consisted of sacrifices offered to all the gods and the pouring of a special libation to Zeus, the Protector and to Poseidon, Ruler of the Seas. In those days, it was the common custom among the Greeks to name their vessels after goddesses, and as a further propitiation the launching was made the occasion of a religious ceremony which Virgil described as follows:

> Ipse caput tonsae foliis evinctus olivae,
> Stans procul in prova, pateram, extaque salsos
> Porricit in fluctus, ac vina liquentia fundit.—ÆNEID.

Here we see the part that wine played in the early days. Appian also described the religious aspect of the blessing of the ancient ships: "On the shores of the sea altars were erected where their bases might be washed by the waves. In a semi-circle the ships of the fleet were drawn about near by, their crews the while maintaining a profound silence. The priests in boats rowed three times round the fleet . . . . adding prayers to the gods that ill-luck should not befall the vessels. Then returning to the shore, they immolated bulls or calves, the blood of which reddened the sea and the shore."

The use of water in the ancient ritual dates back to the Greek ceremony of lustration and to the later Roman practice of using water not only as a token of purification but also as an element in the act of priestly blessing. Here we have the pre-Christian practice of baptism. Like other pagan customs, wine and water were given place in Christian ceremonials, but not infrequently with a modified or deeper meaning. It was thus that wine and water became elements of the sacrament of the Christian Church, while water alone remained the token of purification and a part of the blessing at the time a person was brought into the church, named, and placed under the protection of a particular patron saint.

During the Middle Ages, religious zeal and its derivative superstitions led to the custom of naming ships after saints, as the more ancient craft had been named after pagan gods and goddesses; and this practice was carried to the extremity of saintly image-worship—no craft being sent to sea without its shrine and an imposing array of attendant images. Thus began the practice that subsequently led to the evolution of the figurehead and the effigies placed in the niches about the stern galleries of more modern vessels. Guerin, in his history of the French Navy, tells us that the ships of Louis IX, when he sailed for the Holy Land in 1248, were provided with every facility for conducting mass, each ship having an altar and a priestly retinue. These altars were situated in the after part of the ships—just as the Greeks and Romans reared their shrines there in their own days, and the index of the antiquity of the practice survives in the name of the "poop" deck—the highest aftermost deck of the older type of modern vessels. This name is derived from the Latin term "puppis," which was the name the ancients gave to the honored after deck where they kept their "pupi" or doll-like images of their tutelary deities and where they offered before them libations and sacrifices.

As Taylor has told us in his "Primitive Customs," "Some religious ceremonies are marvels of permanence, holding substantially the same form and meaning through age after age, and far beyond the range of historic record." In proof of this, remembering what has been recorded of ancient Greece, it is instructive to know that at the launching of a modern Greek vessel her bow is decorated with flowers, and at the instant the ship takes the water her captain raises a jar of wine to his lips and then empties the rest of it upon the deck of his craft. Among the Turks, the launching of a vessel is of religious significance, and a priest attends asking the blessing of Allah and praying that the ship may have a prosperous and a successful career and ride safely over the waves in all weather. Sheep are sacrificed just as the vessel starts for the water, and the flesh is subsequently given to the poor. No wine is spilt upon the vessel's bow, but a feast is afterwards given to the participating officials and the invited guests.

In Russia, when a naval vessel is launched, the Greek Church participates in a very imposing manner. The service includes the

blessing of the ship in detail—the officiating priest and his attendant acolytes and choristers marching through all the decks, burning incense, carrying lighted candles, and sprinkling the craft everywhere with holy water—all the while prayers are read and chants are sung. When the ship has thus been blessed the crew are assembled before an altar especially reared for the occasion within the vessel, and, after the craft's colors are blessed, each member steps forward to the altar, kisses the priests hand, and receives the benediction of the church. This carries us back directly to the practice among the Egyptians of purifying their ships by lighted torches, of burning sulphur, and of the breaking of eggs by the priests within their vessels, and later to the very similar custom among the Greeks leading to what generally became known as "the purification of the ship." Combined with the subsequent libations, we see in the present ceremony of the Greek Church a survival of the ancient practice which had for its purpose the driving out of evil spirits, the purifying of the body, the propitiation of the deities, and the beginning of a new life. In Russia, to-day, wine does not enter into the ritual of the church at the launching of ships, the breaking of a bottle of wine at the actual naming of the vessel being a secular performance entirely apart from ecclesiastical participation. In this we see the reflex of the practice among other nations introduced into Russia only within the recent period of her advent upon the sea.

During the days of Venetian dominance upon the Adriatic and the Mediterranean, the church took a conspicuous part in the launching functions of all official craft. It was then the custom to espouse the Adriatic at the time of the floating of the vessel, and this was done with much significant pomp, the ceremony closing by the Doge or some other high official throwing a bridal ring into the sea. In the Museum at Venice to-day there are a number of these rings, and in recognition of that old custom a pretty revival of it was practiced at the launching of the submarines recently built for the Italian Government.

In 1488, when the *Sovereign* was launched at Humble—England's foremost dockyard of mediæval times, in the presence of Henry VII, we are told the ship was formally renamed and the renovated vessel blessed with all the ceremonial display customary in England in pre-Reformation times—"A mitred prelate with attendant train of priests and choristers, crozier in hand, with

candle, book, and bell, and holy water stoup" performing the benediction. With the coming of the Reformation under Henry VIII, the official participation of the Church of Rome disappeared in England upon such occasions. The same, too, is true of Protestant Europe during the same period, although we are told the Lutherans practiced a baptismal ceremony at the launching of their vessels while they attach no importance to the observance. In the early part of the seventeenth century, in England, the launching of government vessels was entirely devoid of religious significance so far as the church was concerned, and what did survive of ancient custom was more strictly a remnant of the far-away pagan libation. The ship *Prince Royal* was launched at Woolwich in 1610, and the launching function was performed by Prince Henry in the manner described as follows by Phineas Pette, one of the master shipwrights of James I: "The noble Prince, himself, accompanied with the Lord Admiral and the great lords, were on the poop, where the standing great gilt cup was ready filled with wine to name the ship so soon as she had been afloat, according to ancient custom and ceremony performed at such times, and heaving the standing cup overboard. His Highness then standing upon the poop with a selected company only, besides the trumpeters, with a great deal of expression of princely joy, and with the ceremony of drinking in the standing cup, threw all the wine forwards towards the half-deck, and solemnly calling her by the name of the *Prince Royal*, the trumpets sounding the while, with many gracious words to me, gave the standing cup into my hands."

During the same century, in the Catholic parts of Europe, the Church of Rome still participated. In 1675, Henry Teonge, chaplain in the British Navy, visited Malta in His Majesty's Ship *Assistance*, where he witnessed the launching of a Maltese craft, which he describes in this manner: "This day we saw a greate deale of solemnity at the launching of a new bryganteen of 23 oares, built on the shoare, very neare the water. They hoysted 3 flaggs in her yesterday, and this day by 12 they had turned her head neare the water. When as a greate multitude of people gathered together, with severall of their knights and men of quality, and a clowd of fryars and churchmen. They were at least 2 howers in their benedictions, in the nature of hymns or anthems, and other their ceremonys; their trumpetts and other

music playing often. At last 2 fryars and an attendant went into her, and kneeling downe prayed halfe an howre, and layd their hands on every mast, and other places of the vessell, and sprinkled her all over with holy water. Then they came out and hoysted a pendent, to signify she was a man of warr; and then at once thrust her into the water." Malta was given to the Knights Hospitalers by the Catholic Emperor Charles V in 1530, and being an island and under its own particular government, we see that the ceremony had escaped the immediate influence of the Reformation.

In Catholic France in the eighteenth century and at the beginning of the nineteenth century, especially among the merchant craft and fishing vessels, the launching ceremony was closely analogous to the baptismal ritual at the time of christening an infant. The custom was one that lay close to the hearts of the common people, and the parish priest, a god-father and a god-mother chosen for the occasion were the principal participants—the god-parents not infrequently being children. The ceremony was very simple and lovely. The god-father carried a bouquet which he duly presented to the god-mother, and with this done, both sponsors then pronounced the name chosen for the new vessel, and the priest repeating it so declared the vessel named—finishing the ceremony with the sprinkling of holy water upon the bow of the boat and with a benediction. To-day, the official ceremony at the launching of naval vessels carries out in spirit this older practice save that there is more pomp and churchly parade. There is a god-father and also a god-mother. Should the ship be named after a national hero or a famous officer, one of the sponsors is generally a descendant. A priest high in the dignity of the church leads in the formalities accompanied by acolytes and choristers. He blesses not only the ship, herself, but also, in accordance with ancient custom, sprinkles holy water upon the launching ways and gives them the benediction of the church. No wine is spilled upon the ship's bow, but the distinguished guests are invited to what is termed a "vin d'honneur" where champagne flows freely and a bountiful repast is served. This is a very old custom that has existed for many centuries—especially among the fishermen of Europe, and to decline either the food or the drink then offered was formerly considered an omen of misfortune.

It was not until the early part of the nineteenth century that either a layman or a woman took any part in the official ceremony at the launching and naming of a British man-o'-war. Prior to that time, if the formalities were not conducted by a member of the royal family, the naming was done by some high functionary of the port or dockyard staff. The present Queen of England is said to have originated the religious service now a part of the launching of British ships of war; and the occasion when the practice was thus instituted was at the launching of the *Alexandria*—named after her—in 1875. Since then a full choral service has been prescribed, which includes extracts from the 107th Psalm—beginning with the twenty-third verse—together with a special prayer of great beauty. The benediction is in accordance with the ritual of the Church of England and therefore does not include the use of holy water. The civil ceremony which follows consists of the usual naming of the vessel by a fair sponsor after which a bottle of wine is smashed upon the vessel's bow. This blessing of a British ship carries us back by actual record of the fourteenth century, when in 1390, so the monk of St. Denys tells us, referring to the Duke of Bourbon's expedition to Genoa under the Earl of Derby, that "According to ancient custom and to ensure success, the ships were blessed by the priests"; and again, in July of 1418, the Bishop of Bangor was sent to Southampton to give a benediction to the King's ship lately built there—called the *Grace Dieu,* and was an occasion of much imposing ceremony: the worthy bishop being paid five pounds for his trouble. William Laird Clowes, in his history of "The Royal Navy," tells us that there is no trace in the British records of ship-baptism with wine in the fifteenth century.

In the latter part of the eighteenth century and during a considerable period in the first half of the nineteenth century, it was the custom in France to remove all impediments to the launching of their ships but a single beam or heavy timber which is commonly known among shipwrights as the "dog-shore." This beam was canted against the stern post of the vessel in such a manner as to keep her from voluntarily sliding toward the water, and when everything was in readiness this shore was chopped through and knocked out of the way. This task was hazardous in the extreme and a volunteer for the work was commonly chosen from among the convicts in the galleys. Clothed in red, this man would

take his place between the launching ways and under the shadow of the juggernaut-like craft that towered ponderously above him. At the proper signal, he would begin to chop with his axe into the dog-shore, and if alert and quick enough he was able to drop into the pit dug for him before either this timber fell or the ship rushed down upon him crushing out life or fearfully wounding him. Not infrequently the man was killed and very often he was wounded and blood flowed, thus seeming to perpetuate the sacrificial offerings of the ancient Norsemen and the similar primitive practices among some of the South Sea Islanders. If the convict escaped with his life, freedom was the reward for his perilous undertaking.

In our own country, tradition does not carry us very far back so far as we are immediately concerned—our ceremonies naturally following the customs prevailing in England at the time our forebears landed here; and so far as the records examined go to show, there was no religious significance given to this function by us.

It has been said that water was used at the launching of the *Constitution,* in 1797; but if this be so, it was broken upon the bow of that ship at one or the other of the two unsuccessful efforts first made to get that vessel overboard. When the *Constitution* was finally launched at the third effort, the late Rear-Admiral George H. Preble tells us in his manuscript history of the Boston Navy Yard, that "Commodore James Sever stood at the heel of the bowsprit, and, according to time-honored usage, baptized the ship with a bottle of choice old Madeira, from the cellar of the Honorable Thomas Russell, a leading Boston merchant." No one can question the fighting merits of the *Constitution,* nor belittle that abundant glory that she reflected upon our flag in the days when every victory counted with especial weight. Let those that attach a superstitious value to either wine or water bear this fact in mind.

In 1858, the U. S. S. *Hartford* was launched at Boston, her launching sponsors being three in number. One was the daughter of Commodore Downes, one the daughter of Commodore Stringham, and the other was then Lieutenant George H. Preble of the navy. As she touched the water, Miss Stringham broke a bottle of Connecticut River water across the ship's figurehead, Miss Downes smashed a bottle of Hartford Spring water, and Lieu-

tenant Preble concluded the formalities by emptying a bottle of sea water upon the vessel's bow. The particular significance of each bottle of water is too plain to call for explanation; and, again, the performances of the *Hartford* are too fresh to need present point. In each case, however, it is quite evident that neither the wine nor the water had anything to do with the fighting efficiencies and the enduring good fortune of those famous vessels. In the spirit of those ceremonies, the spilling of wine or water represented nothing more than unthinking tributes to tradition and a cheerful subscribing to superstition. Their sponsors were probably totally unmindful that they were indulging in parodies of ancient religious customs—born first in the pagan mind and subsequently dignified by adaptation on the part of the early Christian Church. The practice with us to-day of using either wine or water in secular hands is without significance or claim to serious consideration.

In the pride of our might and the power of the modern sea-going craft, we have lost the supplicating spirit of the seafarers of the past; and we have preserved in parody only a part of a heartsome appeal that even the heathen once made to his tutelary deities that the wind and the seas might be tempered to his frail craft, and with his oblation offered he found strength in that imagined protection and was able to face undaunted hardships of which we scarce can dream to-day.

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NOTES ON THE ERRORS OF STADIMETERS.

By MIDSHIPMAN G. P. SCHUYLER, U. S. Navy.

The stadimeter is constructed to solve an imaginary right triangle at the most acute angle of which the observer is located, the observed vertical base forming the short side of this right triangle, and the measured distance the longer and necessarily horizontal

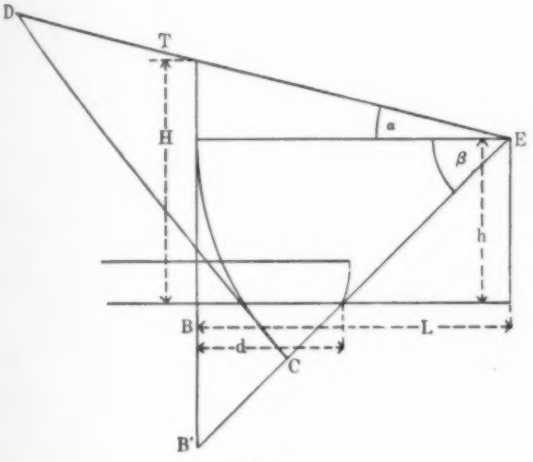

FIG. 1.

side. When used on board vessels cruising in formation, the distance is commonly measured at a depression, and the reflected image of the main truck is by day brought down to the direct image of the armor belt, and by night brought down to the apparent level of the stern light, and the distance between masts is added to the reading to give the distance of the foremast. When it is considered that the observer's eye may be 50 feet high, and the distance from stern to mainmast usually exceeds the mast-head

height, and the stern light is only 900 feet ahead of the observer, an error becomes so apparent that its investigation seems desirable, and its usual neglect strange.

Judging from experience with the sextant, the instrumental errors may be reduced by careful adjustment to a few seconds of arc—and at 400 yards seconds of arc mean less than inches in the distance, and less than tenths of inches in mast-head height. Therefore, while there are these outside errors at 400 yards, large enough to have been caused by misjudging the mast-head height by several feet, it is not proposed to go into the errors of the instrument itself, and so a perfect stadimeter is assumed.

Taking an example shown in Fig. 1 where the observer at E, h feet high, distant L from a mast H high, angles on truck T and on water-line at stern, d nearer him than the mast. Letter the angles of elevation and depression α and β respectively. With E as a center and L as a radius draw an arc to cut the lower line of sight at C, and erect perpendicular CD. Then ΔH, the excess of CD over H, is the correction that must be added to the mast-head height setting H, to get the proper reading L.

$$\alpha = \tan^{-1} \frac{H - h}{L} \tag{1}$$

$$\beta = \tan^{-1} \frac{h}{L - d} \tag{2}$$

$$\Delta H = L \tan (\alpha + \beta) - H. \tag{3}$$

TABLE I.

Bearing of observer in points from astern.

Distance.	0	1	2	3	4	5	6	7	8
200 yards.....	16.1	11.6	8.5	6.8	6.0	5.4	5.1	4.9	4.9
300 "	9.1	6.8	5.0	4.0	3.4	3.1	2.9	2.8	2.8
400 "	6.5	4.8	3.6	2.8	2.4	2.2	2.0	2.0	1.8

TABLE II.

Bearing of observer in points from astern.

Distance.	0	1	2	3	4	5	6	7	8
200 yards.....	....	....	11.2	7.9	6.4	5.6	5.2	5.0	4.9
300 "	....	....	6.5	4.6	3.7	3.2	3.0	2.8	2.8
400 "	....	....	4.6	3.2	2.6	2.2	2.1	2.0	1.9

Tables I and II give ΔH in feet for the U. S. S. *Virginia*, Table I being for the mainmast and Table II for the foremast. The values show that when in line the error is about one-third as

much as it is when in column, and that when in position astern, 345 yards from the mainmast, it would be necessary to use a fictitious mast-head height 7½ feet greater than the actual one, or else station will be kept over 20 yards too far away. This is a fact often strangely overlooked by officers of the deck fastidious enough to complain if an admiral's flag is carried above the truck light in such a way as to make the mast seem about a foot too high. Going from a 2-point line of bearing to a 4-point line of bearing (see Table II) requires a 2-foot change in the fictitious mast-head height, or else an unconscious closing in of 6 yards results. It may be noted that for a mast 132 feet high, setting the

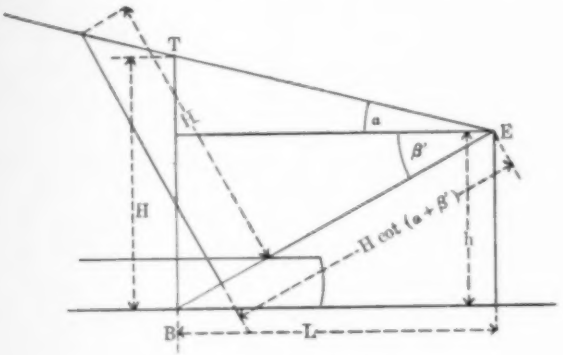

FIG. 2.

mast-head height 1 foot different will cause an error of 3.03 yards at 400, 2.27 yards at 300, and 1.52 yards at 200 yards distance, so in working under average conditions, 1 foot in mast-head height roughly corresponds to three yards in the distance of the next ship.

Even if the mast could be seen at the water-line level, an error would be caused by the elevation of the observer. The stadimeter being constructed on the assumption of a right-angled triangle of observation, the distance given by the reading for a mast-head height of H is, as shown by Fig. 2, $H \cot (\alpha+\beta')$ where $\alpha=\tan^{-1}\frac{H-h}{L}$ and $\beta'=\tan^{-1}\frac{h}{L}$. Consequently an error equal to $L-H \cot (\alpha+\beta')$ is introduced. By trigonometric reduction the value of this error can be shown to be $\frac{h(H-h)}{L}$, and it only slightly

exceeds 3 feet in 400 yards with the usual values of H and h, or at that distance, is the equivalent of an error of .4 inches in the mast-head height.

We are now prepared to simplify our conception of the fictitious mast-head height, for in Fig. 1, if we continue the lower line of sight through the water-line till it cuts the line of the mast prolonged at B' we can consider ourselves angling on a fictitious vertical base TB' in which $BB'=\Delta H$. Of course as the observer is elevated, TB' is not *exactly* what he should set for the mast-head height in order to measure at a depression and yet read off the true horizontal distance. The last paragraph, however, was introduced to show how slightly the observer's height affects observations of bases where like B' the lower point angled on can be considered as coming vertically below T, the point at the upper end of the base. The method of the last paragraph can be used to show that an error of only 4 feet in 400 yards need be expected if, instead of using the rigorous formula

$$\Delta H = L \tan\left(\tan^{-1}\frac{H-h}{L} + \tan^{-1}\frac{h}{L}\right) - H,$$

we use the much simpler one

$$\Delta H = BB' = \text{height of observer} \times \frac{\text{distance from mast to stern}}{\text{distance from stern to observer}}.$$

On many ships, for convenience, an even 50 yards is added to the mainmast's distance to get the distance of the foremast. Unfortunately, in most of our later battleships the distance between masts is greater than this, and the sign of this error is such as to make it additive to the 20-yard error first discussed so that a total error of from 25 to 27 yards is not unusual.

Quite commonly in angling on the mainmast there is used a fictitious mast-head height intended to increase the reading by the distance between masts and so avoid the necessity of performing the addition. In practice, to get this, the officer of the deck at some instant when the distance to the mainmast is what it should be, moves the drum so that the 400-yard mark comes opposite the pointer, and then finds a mast-head height setting that makes the direct and reflected images as they were before. This has to be done hastily and with the ship running steadily so that little gaining or losing can occur during the adjustment.

If it is desired to accomplish the same thing by calculation, take the real mast-head height, correct it by Table I, column (1), then increase the fictitious mast-head height thus found, in the same ratio as the proper distance of the mainmast must be increased in order to make 400 yards. For example, dead astern of mainmast a distance of 345 yards gives $\Delta H = 7\frac{1}{2}$ feet. Adding this to a real mast-head height of 132 feet gives 139½ feet. $139\frac{1}{2} \times \frac{400}{345} = 162$ feet to be used in order to avoid adding 55 yards, the distance between masts.

Often the objection is raised that though this method will enable one to tell when he is at proper distance, yet if 40 yards were gained the reading would not be 360 yards, and if 40 yards were lost the reading would not be 440 yards. Working this out we see that at 360 yards the reading is $305 \times \frac{400}{345} = 353.6$ yards, and at 440 yards the reading is 446.4 yards. This, though, is an advantage if considered in the light of warning the officer of the deck of any change in distance, about 7 per cent faster than ordinarily. He has only to bear in mind that the 40-yard tolerance is reached when the stadimeter shows from 45 to 50 yards out. For day work in column, it is best to use a fictitious mast-head height so that distance reads directly to the foremast, and in any case where possible, the base should be taken entirely on the mast, say from truck to lower top.

In many cases ships suffer a list of from 1° to 2° due, perhaps, to using coal unevenly. Assuming the observer dead astern of the observed ship which is on her course, it is strange that this effect should by day usually increase the distance kept, and by night diminish it.

By day, with the ship heeled, the truck is brought down to the armor belt or rim of top at a place not on the center line, the plane of the stadimeter usually remaining vertical. Then since the angle between truck and a point on the top rim 2 feet out board, or a point on the armor belt 4 feet from the center of the stern, is greater than the angle between truck and center of top, or between truck and center of water-line at the stern, the angles that we measure are too large, and if the heel is θ, distance is kept too far by an amount equal to $(\sec \theta - 1) \times$ the intended distance

to mainmast. This error amounts to only .07, .22, .51, .91 and 1.39 yards for 1°, 2°, 3°, 4°, and 5° heel, in the case of a typical ship at 400 yards.

At night, however, we measure the difference in altitudes of the lights—the reflected and the direct image appearing on the same horizontal line, but not coinciding. Due to the list the angle observed is too small, the distance is read larger than it really is, and the ships get too close by an amount approximately (versin θ) $\times$ the intended distance to the mainmast. This error is always less than the preceding one.

Unfortunately, there are no means of knowing when the plane of the instrument is vertical, particularly at night. We can imitate the method employed with the sextant, namely, rocking the instrument, but instead of the reflected image describing an arc which can be brought to tangency with an extensive horizon, the truck light describes an arc that we must adjust so that its lowest point comes at the same apparent height as the top or stern light, which may be well to one side or the other. Now if it happens that the lower light is to the left of the truck light this is not particularly difficult. If, however, the lower light is to the right of the truck light it is hidden behind the silvered part of the horizon glass when the instrument is vertical. Then the operation is more difficult, for the observer has to rock the stadimeter to see where the lower light is behind the mirror, then rock it some more to get an idea of how the truck light appears to travel in its arc, and then use his memory and judgment in making the truck light at the lowest point of its arc appear just as high as the lower light, which at that instant is concealed behind the mirror. The accustomed observer thinks little of all this, but instinctively, perhaps, times his observations so that the lights come most favorably. Sometimes, however, when close and steering badly, or during column left, a distance must be had quickly, and with the lights so unfavorably placed the best method is to turn the stadimeter upside down for a few minutes, and so avoid the difficulty by getting the clear part of the horizon glass on the right. It will be found more convenient to frequent the starboard side of the bridge rather than the port, all other things being equal, because more chances for favorable observations can be got in that way.

and the convenience of having a small inclination to the horizon mirror (so that when the instrument reads infinity one can see two images of a mast a few feet apart) will be found greatly to outweigh the resulting inaccuracy.

Often the coincidence of the lights is obtained by tilting the instrument, this particularly being the case if the lower light is to the right, just behind the silvered part of the horizon glass. The error from this cause being very small—less than 1½ yards at 400 for a 5° tilt—it is not advisable to give it much attention.

At night, since the stern light is usually half the height of the observer, the values in Table I, for position dead astern must be halved. At night in column, using the stern light, suppose the formation changed to line of bearing. The new distance to the mainmast should be approximately 400 yards—(distance between masts) × (the cos of the bearing of the ship ahead). Say this comes to 375 yards. Then the altitude of the truck light is what it would be from 375 yards dead astern, but the depression of the stern light is not as great as a ship 375 yards astern in the wake would see it, because such a ship, though the same distance from the mainmast that we are, is nearer than we are to the stern light. An error therefore exists, even if the observer succeeds exactly in bringing down the truck light to the apparent level of the stern light. Consider that with ships where the stern light is half as high as the observer, that when astern the error is one-half the value of column (1), Table I, and that when mast and stern light are equidistant from the observer no error exists. Then half the value from Table I, column (1) × the cosine of the bearing of the observing ship will be the error, which is usually less than 10 yards.

The idea of using the truck light and stern light, instead of truck light and top light, wherever possible, "because a longer base is so much more accurate," comes usually from considering keeping distance with a sextant, and failing to keep in mind the sources of errors just discussed, and the radical difference between the instruments. If a sextant is used, a 10-yard change produces an angular change in minutes of arc greater for the greater base, and with an instrument reading to half minutes, closer work can be done dealing with larger angles and larger

changes in them. However, at 400 yards, a 10-yard change in distance is shown on the stadimeter by the same pointer movement whatever the vertical base may be; for the instrument is so constructed that if a smaller mast-head height is set, and smaller changes in angles then correspond to 10 yards, the drum mechanism moves out to the forward end of the arm carrying the index mirror, hence counteracting the decrease in accuracy by measuring the smaller angular changes further from the pivot. There seems from this consideration never to be a valid reason for using the stern light if the top light is lighted—and when account is taken of the difficulties of observing the stern light if it is to the right, and the errors that in any case result from its being abaft the mast, the proper method would seem to be to use the truck light and the top light, and so get actual coincidence in all cases, instead of merely judging equality of altitudes.

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TO FIND THE TACTICAL CURVES.

By CAPTAIN BRADLEY A. FISKE, U. S. Navy.

It is desirable to ascertain the advance and transfer of each ship of a fleet, when changing course through three points, eight points, and sixteen points, with at least three angles of helm, port and starboard.

It seems desirable that these data should be gotten in deep water, and under the same conditions of weather and trim for all the ships.

To get the data, let the flagship of each division stop dead in the water, and let the others pass her in column, say 1000 yards away, at battle speed, and then turn from her, putting the helm over when the flagship bears abeam and keeping it there until within say one point of the new course; then "meeting her," so as not to swing beyond.

Let the flagship and each moving ship take simultaneous compass bearings and range-finder measurements when the helm is put over, and when the moving ship is steady on the new course; and, in case the turn is through 180°, when she has turned through 90°, as well.

The moving ship must, of course, be at such distance in column that one ship will not get between the observing ship and a turning ship.

The flagship of each division can execute like movements near one of the other three ships, after those ships have finished.

$$\text{Each ship's speed} = \frac{\text{Distance to ship ahead}}{\text{Time between turnings}}.$$

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NOTE CONCERNING THE VISIBILITY OF OBJECTS ON A CLEAR, DARK NIGHT AT SEA.

By LIEUT.-COMMANDER RAYMOND STONE, U. S. Navy.

While passing Cape Frio, after coming out of Rio de Janeiro, Brazil, on the night of February 23, 1909, I observed a peculiarity of vision, or visibility, which seems to me worthy of note.

The night being dark (i. e., moonless), but clear and starlit, while looking directly at the cape, its outlines could be fairly well discerned. On accidently turning my gaze away about two points and looking out of "the tail of the eye," I noticed with surprise that the outlines of the headland were appreciably more distinct, and that the land itself was in darker contrast with its surroundings. Thinking that this effect might be due to the eyes becoming more accustomed to the darkness (I had recently come on deck), I tried the same thing several times, always with the same noticeable difference in distinctness. I then asked the officer of the deck to try the experiment; he immediately noted the difference.

Subsequently I experimented on vessels passing at night, with similar results.

Upon mentioning this peculiarity to Commander Ellicott the following day, he told me that he had known of it since his early days (nights) on Chesapeake Bay, and had always, more or less unconsciously, taken advantage of it while navigating along shore; but that he had never heard it mentioned in the course of Navy talk, neither seen it in print. It was certainly a new thing to me; it may also be to others.

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DISCUSSION.

Prize Essay.

(See No. 128.)

Rear-Admiral E. B. Barry, U. S. Navy.—Lieutenant E. J. King has given the service a fine essay.

Not only is it written in an agreeable and convincing manner, but the arrangement is admirable and the logic progresses and unfolds with the subject.

It is well to note at the very beginning the essayist lays down, as the first aid to efficiency, permanence of association. This, as is well known, always has been lacking in our service. Surely some way can be devised, particularly with four-year enlistments, to detail a crew for a battleship or cruiser, that can be kept together at least for two years. Nothing ever exceeds permanence of association in making for ship efficiency. The essayist holds up as the most valuable, *esprit de corps*, but I venture to say you cannot have that without permanence of association. The line between regimental tradition and permanence of association cannot be drawn easily; famous regiments in all countries merge them one into the other.

I think there is too much detail thrown on the executive, but I am hardly prepared to turn over to division officers "record, rating, drill, exercise, instruction and clothing," also "their (the divisions') assignment to stations and details as regards guns, ammunition supply, emergency stations, watches, ship's duty, boats, special drills, etc." By the time the division officer gets control of this list, half of which he has now, it would be superfluous to have an executive; possibly a captain would not be much use either.

I believe the essayist is right about the arrangement of organization when commissioning ships, and supposed every division was assigned specific duties by its division officer, just as is the engineer's division. I have known this to be done; in fact, I thought it always was done at present.

About one thing I am with him heart and soul. Since the good old days of the wooden ship I have never been able to see any reason for the existence of a powder division. I want it abolished and merged into the gun divisions, but I want to see a navigator's division, as of old. There are men in battle stations that do not carry powder, whip shell or fire arms, or work boilers and engines. Who look after sudden injuries? Who do a thousand and one things suddenly wanted? If a division is to be diverted from its legitimate duty, the ship's fire slackens, perhaps just when that of the enemy was being dominated. You don't want many men, but you want some, and they should all be good leading men too.

I cannot agree with the remarks about watch and division officers and

four divisions. Because some captains and some executive officers have been absurd in days gone by, there is no reason to condemn all the worthless "non-seagoing" superannuated "old" officers. I have known many ships of all sizes and classes having more and sometimes less than four gun divisions. I have known "old" officers, even as far back in the dim past as the year 1901, to have their gun divisions arranged according to the grouping of the battery. This is a tax on the credulity of "seagoing"[1] officers, yet it has been done.

Under the requirements of a standard system of organization, the assignment of duties to divisions seems to be the system that has obtained for many years. It came in shortly after the birth of the so-called "White Squadron" and was general before 1898.

I have long felt that there was nothing more absurd than our title of "petty officer." It has lost its meaning, and I think the remarks on this subject very apt and very much to the point. "Rated man" would be the proper title for all persons not in the true naval petty officer classes. Separate the naval from the civil.

I concur in the remarks on gun divisions. Abolish the powder division as such and distribute the force, exclusive of the engineer's division and what is designated as ship's staff, so as to give gun divisions adequate strength. I have my doubts as to the relative status of the permanent and semi-permanent details of people of the so-called ship's staff. If you have these people performing two separate duties, the one the work for which they are specially rated, the other everything else, I cannot grasp it clearly why, in the first instance, they are under the ship's staff officers and secondly under the officers commanding their respective divisions. Why have these people in two divisions at all? Is an electrician to be in the electrical division when repairing a dynamo or an electric circuit, and then in the first, second, third gun division to look after powder, we may say, or shell? If the turret turning circuit needs attention who gives it? Does that particular electrician hop from division to division? I think the essayist did not mean this. Once you get rid of the powder division and increase correspondingly the gun divisions, why not put the rest of the working force into the navigator's division and let some of the electricians be attached to the gun divisions?

The remarks on permanent organization recall the disastrous days of the Civil War, when the States refused to keep up their quota by filling the old regiments, but organized new regiments solely for the purpose of making more officers. Thousands of lives were sacrificed in this way. During the year 1898 the ship aboard of which I was serving had her complement materially increased. The additions were all green men, but it was surprising how rapidly they became amalgamated and how rapidly they became efficient. We must continue to hope for permanent organization.

The application of standard groups shows the merit of the scheme and the care devoted to its development. To be sure, there seems to be no

[1] As defined by our professional magazine critics, a "seagoing" officer is a line officer who shirks sea duty and stays ashore so as to talk and write.

provision made for marines, but the essay was written probably when the internal administration of the navy was thought to belong to the commander-in-chief. It will be easy, however, to insert them as part of the complement wherever deemed necessary.

Altogether this strikes me as a thoroughly digested scheme, capable of practical application.

Lieutenant King is to be congratulated upon his admirable essay.

The School of the Captain.

(SEE No. 129.)

CAPTAIN A. C. DILLINGHAM, U. S. NAVY.—In the March edition of the PROCEEDINGS OF THE NAVAL INSTITUTE, Rear-Admiral Goodrich submits an article entitled, "The School of the Captain."

This article might more properly be called, "Inspection of the Captain," for a captain's schooling has been going on for some thirty or forty years during his progress through the grades, with the details of watch officer, navigator, executive officer and commander.

At the start, in discussing this article, it seems to me that a system which makes it necessary to wait thirty or forty years before deciding whether or not an officer is fit for the service is bad, and the admiral is right in saying that to retain an incapable officer in the service works injustice to the government.

If our system of promotion is bad, and it is a fact that we have captains who are unworthy of their commissions and commands, then the admiral is beginning at the wrong end for reform. However, if it is considered necessary to test out our captains for capability, then such tests should be applied before a captain is ordered to a command, or still better, at his examination for promotion from commander, otherwise the suggestion of the author is impracticable, because it would delay the progress of the fleet to meet the tactical requirements of war.

If we are lacking in the fleet, it is in not having been able to get beyond a certain preliminary stage in tactics, and this has been caused by the too frequent changes in commander-in-chief, and second, because the commander-in-chief has never been given the time or opportunity for doing any progressive tactical work with his command.

Up to this last cruise of the Atlantic fleet, we have been able to proceed to only a limited extent in tactics; with every new commander-in-chief we would begin all over again, never getting beyond the preliminary stages of tactical battle work.

Evans, with the conditions of his cruise, was limited in evolutions, and to a ten-knot speed; Sperry, with the *Kentucky* and *Kearsarge*, was limited to a maximum battle speed of say thirteen knots, and limited in tactical exercises by coal supply to carry out his itinerary. These officers have taken advantage of every opportunity to improve the tactical conditions of the fleet, and though incalculable good must have come to the fleet in other respects with such a cruise, tactically, it has been little more than a splendid school for the captains.

Schroeder has had the homogeneity of his command improved, and his

standard battle speed increased to sixteen knots. Let us hope that nothing is going to be put in his way to prevent rapid progress in fleet battle drills.

Upon the return of the Atlantic fleet, I occupied an excellent position for observing the anchorage of the fleet, and the evolution was performed in a manner almost perfect, tactically. I saw but one position pennant exhibited, and apropos of Admiral Goodrich's article, it would be interesting to know how Sperry, Wainwright, Schroeder, and Potter size up their captains.

Of course it is possible to place a battleship at some locality for the purpose of testing out captains, and getting their blueprints, and captains before being ordered to command a battleship might be sent to this battleship to take the test, but such a test, under such conditions, would not give the desired results, and the test proposed by Admiral Goodrich would get no results, because the conditions of the test are not such as to require any display of nerve or knowledge of the tactical signal book. Such a test as Admiral Goodrich proposes might be made in the case of a lieutenant-commander for promotion to commander.

The test proposed by Admiral Goodrich must, of course, take place in open navigation, clear of other vessels, because it would be quite impossible to be charging around in close navigation among other vessels at a speed of fifteen knots.

I have known a captain who could do the test laid down by Admiral Goodrich and get an excellent blueprint, but put that same captain in close navigation, or in the vicinity of other ships, or on the bridge during fleet evolutions, and he would go to pieces, and would tremble and shake so that it would be impossible for him to get his hand in his pocket.

If we are going to test captains, the place to do it is on the bridge during fleet evolutions at standard battle speed of say sixteen knots, but I would suggest that there is no test for captains under any circumstances better than the position pennant and indications during the general progress of the fleet, provided that the indications of this pennant and other indications are followed up by the flag officers in the fleet. It is absolutely up to the flag officers of the fleet.

It is not possible for an officer of Admiral Goodrich's experience to underrate the advantages of schooling that a captain must have had in reaching his grade; he evidently believes that there are some captains who are unworthy of their commissions, who have reached their positions by reason of a faulty system of promotion, and he proposes a method of finding out who these officers are, but he does not propose a method of getting rid of these officers after they have been found deficient. It is the same old complaint, an inefficient system of promotion, and until that system is changed, there is no better way of getting efficiency than leaving the captains in the hands of the flag officers, who will get their knowledge of the capabilities of their captains through the position pennant, and rigid inspections.

I am entirely in accord with Rear-Admiral Goodrich in the opinion that it would add to the efficiency of the fleet, and be doing justice to the government, and the capable officers of the fleet, if we could get rid of incapable officers of all grades.

The Invention and Development of the Naval Telescope Sight.

PROFESSOR PHILIP R. ALGER, U. S. NAVY.—In connection with Captain Fiske's interesting account, in this number of the PROCEEDINGS, of his invention of the naval telescope sight, it seems worth while to call attention to one point which is perhaps not generally appreciated.

Without the telescope sight the present state of perfection of naval gunnery could never have been attained.

At this late date it is hardly necessary to advance arguments in support of the foregoing proposition, but, at the risk of appearing egotistical, I will quote from a paper read at the War College in August, 1896 (see No. 80 of the PROCEEDINGS), to show how long ago it was well understood in the Bureau of Ordnance that *with the successful application of the telescope sight there began a new era of naval gunnery, in which perfection of mechanical appliances for pointing guns and skill in handling those appliances would produce results altogether impossible up to that time.*[1]

". . . . such bad shooting has been principally caused by using sighting arrangements so imperfect as to make it impossible for any man, however careful and cool, to determine exactly when his line of sight is on, while with the telescope sight no man can help knowing when the line of sight is on. Of course great skill is required to so handle the gun as to bring its line of sight on, and excitement and impatience will frequently cause men to fire without waiting till the proper moment, but the fact remains that with the telescope sight for the first time it is possible to know the proper moment for firing. *The skill which is now needed is that which can be acquired by exercise and drill in pointing guns at moving objects, and in no other way.* Let a man be given sufficient practice with a gun, so that he is able to rapidly bring the line of sight upon a moving target; give that man the range within 5 per cent, and he has then only to have sufficient coolness and self-restraint not to fire except when the line of sight is on and he will hit a battleship at 2000 yards with almost every shot.[2] Of course it is no easy thing to point a heavy turret gun accurately; a turret weighing 500 tons cannot be stopped and started instantaneously; but with practice sufficient skill can be acquired, and in no other way. To take advantage of the relative motions of gun and target by stopping the turret with the line of sight ahead of the target and firing as it comes on, or to train slowly in the same direction as the target is moving and fire as the line of sight comes up and slowly passes across the target, these are things which no man can do well in time of excitement unless he has done them thousands of times before in exercise. *But any intelligent man can do them well if he has had sufficient practice, and if he does them well, he can, with the telescope sight, do such shooting as has never before been done with a gun at sea.*"

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[1] See also an article on "Telescopic Sights for Guns," by Lieutenant Joseph Strauss, U. S. N., in the U. S. NAVAL INSTITUTE PROCEEDINGS for September, 1896.

[2] At this time it was generally thought that 4000 yards would be the extreme battle range, and not more than 2000 yards the range for a really decisive action.

Although this view was then far from meeting with general acceptance in our service, the Bureau of Ordnance had faith in it, and as early as 1893 began to fit telescope sights to the 4-inch and 5-inch mounts in course of manufacture. At the date of the above-quoted lecture (1896), all U. S. naval guns in course of manufacture were being fitted with telescope sights and steps were being taken to replace the old sights of the more important ships in commission. A number of our ships in the war with Spain had their batteries equipped with the telescope sight.

In the British Navy, on the contrary, recognition of the value of the telescope sight was long delayed. It was first used in 1898 on the *Scylla*, under Percy Scott's command; the *Terrible*, under the same officer, made her famous gunnery record in 1900; and in each of these cases the sights were crude, improvised arrangements, the telescopes purchased with private funds and installed by the ship's force.

The following quotation from *Brassey for 1902*, read in connection with the foregoing statements, affords convincing proof that in this matter of the telescope sight the U. S. Navy was the pioneer:

"The question of sighting bears very closely on the improvement of gun practice. A telescope sight was approved some two years ago, and we shall soon be able to judge by an examination of fleet averages whether the practice has been materially improved thereby. A good man will undoubtedly profit by the use of a telescope; an indifferent or stupid man will do better without. There are also atmospheric conditions that do not favor the use of a telescope, and it is absolutely necessary to have the ordinary sights as an alternative. Still, the introduction of a telescope is a step in the right direction and gives additional opportunities for the exercise of careful training."

The complete lack of understanding displayed in this British naval expert's statement is only astonishing having regard to its date; a similar view was common in our own navy three or four years earlier.

New Navigation in Practice.

(SEE No. 123.)

LIEUT.-COMMANDER T. P. MAGRUDER, U. S. NAVY.—Referring to the notes on "New Navigation in Practice," published in No. 123 of the PROCEEDINGS, Ensign H. S. Babbitt, U. S. Navy, has suggested using the formulæ:

$$\tan \phi = \tan d \sec t.$$
$$\sin h = \cos (\phi - L) \sin d \operatorname{cosec} \phi.$$

Take out ϕ in the same *quadrant* as t and give it the same *sign* as d. This is a better form for logarithmic computation with our present tables. Since the computed altitude will always be nearly the same as the observed altitude, any error in applying signs becomes at once apparent. See Muir, pp. 437-8.

I concur in Mr. Babbitt's suggestion.

PROFESSIONAL NOTES.

Prepared by Professor PHILIP R. ALGER, U. S. Navy.

SHIPS OF WAR, BUDGETS AND PERSONNEL.

ARGENTINA.

The Argentine Republic has adopted a naval program which is evidently intended as a reply to the Brazilian vessels now building. Two 19,000-ton battleships are to be built, and will be armed with ten 12-inch, fourteen 6-inch and a number of smaller weapons, while the designed speed is 21 knots. The ships will be named *Moreno* and *Rivadavia*, which, it will be remembered, were the names of the armored cruisers sold to Japan at the end of 1904 and renamed *Nisshin* and *Kasuga*. Eighteen torpedo-craft are also to be built, and it is regarded as probable that the whole of the order will go to German yards.

AUSTRIA.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Radetsky	14,500	Trieste.	Building.
Zrinyi	14,500	"	"
Erzherzog Franz-Ferdinand.	14,500	"	Launched Sept. 30, 1908.
Scout.			
Admiral Spaun	3,500	Pola.	Building.

According to *Le Yacht*, the *Radetsky* will be launched in July and one of the four proposed 20,000-ton battleships will be laid down in her place. The new battleships are to carry ten 12-inch guns and a secondary battery. The *Zrinyi* will be launched in the spring of 1910.

The plans of the new *Dreadnought* battleship have been completed and forwarded to the Stabilimento Tecnico Triestino, by which they are to be constructed. The following details have been made known: Length, 492 feet; beam, 85 feet 3 inches; draft, 29 feet 5 inches, with a displacement of 19,600 tons. They are to be fitted with turbine engines, to develop 25,000 horse-power, giving a speed of 22 knots. Protection will be afforded by a complete belt of nickel-chrome steel, 10.6 inches thick at the maximum, while the armament will consist, according to one report, of ten 12-inch guns of the Skoda-Pilsen system, and twenty or twenty-four 4.7-inch Q. F. guns; while, according to another statement, the armament will consist of eight 12-inch guns, ten 9.4-inch guns and twenty 4.7-inch Q. F. guns. The cost of each ship will be 42.5 million marks (£2,275,000).

MARRIAGE OF OFFICERS.—New regulations have been issued in regard to the marriage of officers of the navy. Only one-third of the officers of the executive branch may be married, while 66 per cent of the engineer officers and officers of the medical branch are privileged to do so. Officers applying for leave to marry must prove a special investment at 4 per cent of a capital sum, varying, according to rank, from 15,000 to 60,000 kronen (£750 to £3000). In the case of officers under thirty years of age, the investment must be 50 per cent higher in value.—*United Service Institution.*

BRAZIL.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Minas Geraes	19,250	Elswick.	Launched Sept. 10, 1908.
Rio de Janeiro	19,250	"	Building.
Sao Paulo	19,250	Vickers.	Launched April 19, 1909.
Scouts.			
Bahia	3,500	Elswick.	Launched Jan. 20, 1909.
Rio Grande	3,500	"	" April 20, 1909.

On April 19 the Brazilian battleship *Sao Paulo* was successfully launched from the Barrow yard of Vickers, Sons & Maxim, Limited.

The *Sao Paulo* is a sister ship of the *Minas Geraes*, built at Elswick for the Brazilian Navy. Her principal dimensions are: Length, 500 feet; breadth, 83 feet; draft, 25 feet. She will have a displacement of 19,500 tons, and a bunker capacity of 2000 tons. Her launching weight as she went down the ways is given by her builders as 10,400 tons, and the length of time occupied in the launch from the commencement of movement till the bows were in the water was just over 45 seconds.

She is to be fitted with reciprocating engines, and her speed is estimated at 21 knots. Her armament, like that of the *Minas Geraes* and the other sister vessel, which is also being built at Elswick, is to be particularly powerful. She is to mount twelve 12-inch guns, so arranged that ten of them can fire simultaneously on either broadside and eight simultaneously either straight ahead or straight astern. In addition to these heavy weapons there are to be twenty-two 4.7-inch guns, besides several 3-pounders and smaller guns; 9-inch armor plate is to protect the broadside, and will be carried up to the upper deck.—*The Engineer.*

The Brazilian scout *Rio Grande do Sul* was launched from the shipbuilding yard of Sir W. G. Armstrong, Whitworth & Co., Elswick. She is a sister ship to the *Bahia*, and is a development of the scout type represented in the British Navy by the *Adventure* and the *Attentive*. The propelling machinery of both vessels is of the Parsons turbine type. The *Rio Grande do Sul* will carry ten 4.7-inch guns, six 3-pounder guns and two torpedo-tubes. This is an exceptionally powerful armament for a vessel of that class.—*Page's Weekly.*

FRANCE.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Danton	18,350	Brest.	Building.
Mirabeau	18,350	Lorient.	"
Voltaire	18,350	Bordeaux.	Launched Jan. 16, 1909.
Diderot	18,350	St. Nazaire.	" Apr. 19, 1909.
Condorcet	18,350	"	" Apr. 20, 1909.
Vergniaud	18,350	La Seyne.	Building.
Armored Cruisers.			
Edgard Quinet	13,644	Brest.	Launched Sept. 21, 1907.
Waldeck-Rousseau	13,644	Lorient.	" Mar. 4, 1908.

The French Minister of Marine has recently completed his exposition of the measures which he finds necessary for ensuring the efficient service of the present naval forces, and for guaranteeing a judicious distribution of the budgetary resources. In his opening remarks he states that this part of his program is strictly limited to what he considers absolutely necessary; it is, further, strictly limited also to present needs only. Questions dealing with the increase of the fleet, and with the laying down of new units to replace older types, are to form the subject of a separate report.

The present program contains the following items: Provision for giving

the warships their full complement of guns, projectiles, powder and stores. The improving of the machinery at the naval bases so as to enable the latter to shelter, dry dock and repair the present ships and those in course of construction, with a view to the prompt mobilization of the fleet, expediting the construction of the ships now in hand, and the improving of their internal arrangements, reducing their superstructure, refrigerating the ammunition holds and so forth, and increasing the stores of materials for naval construction at the different bases. Among his statements with reference to ordnance and ammunition, the Minister of Marine advocates the immediate ordering of the ammunition and stores for the six battleships of the *Danton* class, also a proportion of guns for experimental purposes, and spare guns. The proportion of the latter, as regards large calibers, should not be less than one-sixth the number of guns on board the ships. For the *études* which are to be carried out with a view to the armament of fresh units, several guns will be required. For the present these guns may be limited to one 34-centimeter (13.39-inch) gun, a caliber which is close to that now contemplated by other nations; also, two 14-centimeter (5.51-inch) and two 10-centimeter (3.94-inch) guns, both superior in power to those at present in the service.

In regard to powder, the Minister recommends the formation of a large stock of gun-cotton, to be kept in reserve in prevision of a war, but which could be drawn upon in peace time to hasten the manufacture of powder, when the stock could easily be renewed. A stock of melinite would also be required, seeing that France is in a large measure dependent upon foreign supply for the raw material used in the manufacture of this powder. For a long time fault has been found with the sub-caliber tubes, in that firing practice with those now on board, and with reduced charges, does not afford the gunners adequate training. For this reason a new type of sub-caliber tube has been designed, having a high degree of precision, which makes it possible to ascertain easily the point at which the projectile meets the extension of the line through the sights, and is also conducive to reduced expenditure. The tubes in question are 37 millimeters (1.46 inch) in caliber, and their design was completed as early as January, 1908. The substitution of melinite for black powder is advocated for the charging of armor-piercing shells of calibers over 10 centimeters (3.94 inches). The cast-iron shells now owned by the navy, and which are charged either with black powder or with melinite, will cease to be used with a view to fighting purposes, and will be replaced by more effective steel semi-armor-piercing shells containing a charge of melinite. Space being available in the holds of the *Démocratie* class of battleships, their store of ammunition for the 19-centimeter (7.48-inch) guns is to be increased by 288 rounds for each ship —equal to an increase of 1152 rounds for the four ships. A corresponding increase is to be made in the ammunition-store at the bases. As a general rule, it has been settled that all ships are to have on board the whole of the fighting ammunition for which their holds have been designed, plus a permanent store of practice rounds sufficient for three months. In case of war being declared, there would only remain to replace the latter ammunition by full service charges. The stores of ammunition at the bases are to be maintained at twice the quantities on board.

At the present time there are in France seven dry-docks able to accommodate battleships of the *Patrie* class, one at Cherbourg, two at Brest, one at Lorient, one at Toulon and two at Bizerta. Four of these dry-docks (one at Brest, the one at Toulon and the two at Bizerta) could just take any of the six 18,350-ton turbine battleships of the *Danton* class, but the clearance between the side-walls of the entrance-gates and the ship's sides is too small, and the entrances to the docks in question are to be enlarged. The building of six new dry-docks (two at Cherbourg, two at Brest, one at Toulon and one at Bizerta), together with the construction of the necessary machinery, is to be proceeded with generally on the lines decided upon as early as 1901. These new docks will be capable of accommodating

larger units than those of the *Danton* class. Besides the dry-docks in question, extensive harbor works are mapped out, also the provision at each of the five naval ports of an adequate store of liquid fuel. In regard to the completion of the six turbine battleships, the Minister of Marine states that the naval authorities at Brest hope not to exceed in the construction of the *Danton* the time they took to build the *Démocratie*, whose displacement was 3450 tons less. A somewhat similar result as regards time-saving is anticipated in the case of the sister ship *Mirabeau*, in course of construction at Lorient. Nevertheless, he believes that these two battleships will be completed later than the four others which had been ordered from French private yards, and he proposes measures to hasten government work.

In the course of his exposition the Minister states the following as being indispensable alterations to be made in the first line of French battleships: A reduction in the superstructures, these having been found detrimental in an actual engagement. An improved installation for wireless telegraphy. Improvements in the installations for gun-firing control. Revision in the matter of the location of holds and careful refrigeration of those containing ammunition; the decisions arrived at following the *Jena* catastrophe, he adds, advocate the isolation of the black-powder ammunition, and the lowering of the temperature inside all ammunition holds below the limit hitherto accepted. Also the transformation of three units into mine-laying ships, there being at the present time no ships in the French Navy specially fitted up for this service. The total sum which would be required to place the present naval forces of the nation in a satisfactory situation, as regards their fighting value is found by the Minister of Marine to amount to 193,591,800 francs (7,743,000*l.*), made up as follows: Artillery, 3,833,000*l.*; dry-docks, machinery and harbor works, 1,762,000*l.*; expenses on ship construction proper, 1,476,000*l.*; general stores, 672,000*l.*—*Engineering.*

The *Diderot* was launched from the yard of the Chantiers de l'Atlantique at St. Nazaire on April 19, and *Condorcet* from the Chantiers de la Loire on the 20th. The *Vergniaud* at Bordeaux, the *Danton* at Brest and the *Mirabeau* at Lorient are far less advanced, but at least two of them will be launched during the current year.—*The Engineer.*

GERMANY.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Nassau	18,000	Wilhelmshaven.	Launched March 7, 1908.
Westfalen	18,000	Bremen.	" July 1, 1908.
Rheinland	18,600	Stettin.	" Sept. 24, 1908.
Posen	18,600	Kiel.	" Dec. 12, 1908.
Ersatz Oldenburg	18,600	Wilhelmshaven.	Building.
" Beowulf	18,600	Bremen.	"
" Siegfried	18,600	Kiel.	"
Armored Cruisers.			
Gneisenau	11,600	Bremen.	Under trial.
Scharnhorst	11,600	Hamburg.	" "
Blücher	15,000	Kiel.	Launched April 11, 1908.
Von Der Tann	17,000	Hamburg.	" March 20, 1909.
G	17,000	"	Building.
H	17,000	"	Ordered.
Protected Cruisers.			
Emden	3,800	Kiel.	Launched May 27, 1908.
Kolberg	4,300	Danzig.	" Nov. 14, 1908.
Mainz	4,300	Stettin.	" Jan. 23, 1909.
Ersatz Schwalbe	4,500	Kiel.	" June 8, 1909.
" Sperber	4,500	"	Building.
" Falke	.....	.....	"
" Bussard	.....	.....	"

In view of the assertions made that Germany, in the spring of 1912, would have seventeen warships, all of them of the big-gun type, the German Navy Department authorizes the statement that in the autumn of 1912 Germany will have thirteen such vessels. These will be the battleships *Nassau* and *Westfalen*, which will be ready for sea in the autumn of 1909; the battleships *Rheinland* and *Posen* and the cruiser *Von Der Tann*, which will be ready for sea in the spring of 1910; three battleships to replace the *Oldenburg*, *Siegfried* and *Beowulf*, and a cruiser to replace the armored cruiser *G*, which will be ready in the summer or autumn of 1911, and three battleships to replace the *Frithof*, *Hildebrand* and *Heimdahl*, and a vessel to replace the cruiser *H*, which will be ready for sea in the autumn of 1912. The complete German program provides that between 1909 and 1917 fifteen battleships shall be built additional to those now on the list—three in each of the years 1909, 1910 and 1911, and one in each of the six subsequent years; also nine cruiser battleships (one each year), eighteen smaller cruisers and eighteen divisions of destroyers. The object in view is to complete the intended establishment of thirty-eight battleships, twenty battleship cruisers, thirty-eight small cruisers and one hundred and forty-four destroyers.

The following table of German naval constructions, published by the *Marine Rundschau*, is from official sources. As regards dates of entry into service, it stopped at 1912, but we have carried it on to 1917.

Laid down.	Battleships.	Armored cruisers.	Completed.
1906.....	Nassau	(Blücher 16000tx)	1909
	Westfalen		
1907.....	Rheinland	Von der Tann.....	1910
	Posen		
1908.....	Ersatz Oldenburg	G	1911
	E. Siegfried		
	E. Beowulf		
1909.....	E. Frithjof	H	1912
	E. Hildebrand		
	E. Heimdall		
1910.....	E. Hagen	I	1913
	E. Ægir		
	E. Odin		
1911.....	E. Brandenburg	E. Kaiserin Aug.....	1914
	E. K. Friedrich W.....		
	N (Cuirassé d'augmentation)		
1912.....	E. Wissemburg	E. Hertha	1915
1913.....	E. Wœrth	E. Victoria Luise.....	1916
1914.....	E. K. Friedrich III.....	E. Freya	1917

—*Le Yacht.*

THE TRUTH ABOUT THE GERMAN "DREADNOUGHTS."—To anyone who makes a dispassionate study of recent German naval developments, there is nothing to indicate that her present activity in the construction of battleships of the *Dreadnought* type is aimed at any particular power, or has anything in the nature of an intended challenge. The true motive is to be found in the lessons which were taught by the Japanese war, when it was demonstrated to the minds of most, though not by any means of all, naval experts, that the battleship of the future would be armed entirely with 12-inch guns. Now, although this fact was of vital importance as affecting the rating of all existing navies, there was none that was so seriously affected as the German Navy, and this for the following reasons:

At the time of the Japanese war, the effective battleship fleet of the Germans, built and building, included twenty vessels. Ten of these, due to be completed between the years 1904 and 1908, were ships of the first-class, carrying four heavy armor-piercing guns in the main battery, and a large number of rapid-fire guns in the secondary battery. Except in point of size and steaming radius, they were comparable with the best battleships of other nations. The ten earlier ships, completed between 1900 and 1903, were of a decidedly inferior type, carrying in their main batteries a light gun of only 9.4-inch caliber. These earlier ships were somewhat discredited, even before the Japanese conflict; and it can readily be seen that the enhanced value given to the big gun by the results of the battle of Tshushima, placed these ten vessels outside of the battleship class, and actually relegated them to the second line of defence, leaving the German Navy with ten first-class line-of-battle ships.

Long before the *Dreadnought* was launched, the German naval authorities realized that, if their fleet was to maintain its relative standing among the world's navies, there must be a very large increase in the number and power of ships of the first class; and there can be little doubt that this increase was contemplated before the first *Dreadnought* had taken the water. It is the German policy to build always according to a definite program, extending over a period of years, and the authorities have determined that, in order to replace the ten battleships above referred to, and, in addition to this, make the annual appropriations for new ships which are necessary to maintain the relative position of the German Navy among the powers, a program calling for the laying down of four vessels of the *Dreadnought* type every year would be necessary. The program was adopted; the necessary building ships were prepared; large additions were made to the German plants for the manufacture of guns and armor; and the construction of the ships has progressed strictly according to schedule.

There is nothing in these facts to warrant the statement that Germany is attempting to outbuild either Great Britain, the leading naval power, or the United States, which at present holds the second position. It was Germany's weakness in battleships, and not, we believe, any sudden desire for aggrandizement or conquest, that instigated her present ambitious program. Had she not built at the rate she is now building, she would in a fey years time have ranked as a poor third among the naval powers, and her navy would not have been commensurate with her vast and rapidly increasing merchant marine.

That she is not challenging, and probably has no disposition to challenge, the British Navy for the premier position is shown by a dispassionate review of the facts of the case.

By the year 1912 there will be available thirteen German *Dreadnoughts*. On the same date, including the ships recently authorized by Parliament, Great Britain will have in commission twenty *Dreadnoughts*. If the colonies should build the six ships that have been suggested, she will, at that date, have twenty-six. But in estimating the strength of the two navies, it is altogether absurd to omit consideration of the ships of the pre-*Dreadnought* period. Of these, Great Britain in 1912 will possess forty and Germany twenty, but if we omit the ten ships that are armed with 9.4 inch guns, Germany will have only ten pre-*Dreadnought* battleships of the first class. At that date Great Britain will possess of armored cruisers thirty-five, and Germany but eight. The British battleships of the older fleet carry one hundred and fifty-two 12-inch guns. The German battleships mount only forty 11-inch guns. The British cruisers carry sixty-eight 9.2-inch guns, as compared with six 9.4-inch guns carried by the German cruisers.—*Scientific American.*

A good deal of curiosity has been expressed as to the manner in which Admiral von Tirpitz arrived at his estimate of thirteen German *Dreadnoughts* to be built and ready by the end of 1912. In some quarters it was assumed that he was omitting the cruisers, and that if three of these were added to his thirteen, we should arrive at the seventeen of Mr. McKenna, while Mr. Balfour's estimate expedited the four ships of 1910, making twenty-one in all. The following is the German official table, which explains the basis of the German estimate:

Program.	Name.	Completion.
1906	Nassau	1909
1906	Westfalen	1909
1907	Rheinland	1910
1907	Posen	1910
1907	Van der Tann	1910
1908	E. Oldenburg	1911
1908	E. Siegfried	1911
1908	E. Beowulf	1911
1908	G.	1911
1909	E. Frithjof	1912
1909	E. Hildebrand	1912
1909	E. Heimdall	1912
1909	H.	1912

Of the last four, two are to be completed in the spring and two in the autumn of 1912. The *Marine Rundschau* adds a note, in the sense of what was said in the Reichstag, that certain contracts were entered into with two private firms to build each a ship of the 1909 program in anticipation of the legal date of commencement, with the purpose of defeating any "ring" of constructors and of securing an advantage in price. It is noted that the two ships will be ready for trials thirty-six months after the legal date of laying down, viz., April 1, 1909.—*Army and Navy Gazette.*

The German armored cruiser of the 1907 program (*F*) was launched at the Blohm & Voss yard at Hamburg on March 20, receiving the name of *Von Der Tann*. She is the first of the German *Dreadnought* cruisers to take the water, and was on the stocks eighteen months. On a displacement of 18,700 (?) tons she will carry twelve 11-inch guns, with twenty 24-pounders, for defence against torpedo-craft. Turbines of 45,000 horsepower are designed to give a speed of 25 knots, while the main belt will be 8 inches amidships, 6 forward and 4 aft. Save in speed, where things are equal, she will be considerably superior to our *Invincibles*. The *Blücher*, of the 1906 program, is nearly ready for trials. She is slightly larger than the British *Shannons*, and has the very formidable armament for her size of twelve 8.2-inch and eight 5.8-inch, with an estimated speed of 22.5 knots.—*United Service Magazine.*

We find it again stated that the new German battleships *E. Beowulf, Siegfried* and *Oldenburg*, also the *Posen, Rheinland, Westfalen* and *Nassau*, will have a main armament of sixteen 11-inch guns, two in some turrets and three in others, there being six turrets in all, of which two placed diagonally with respect to one another, and four in the middle line of the ships. The anti-torpedo armament is said to consist of twenty 4-inch.—*Army and Navy Gazette.*

The German Admiralty have placed an order for a large cruiser of the *Invincible* type (*H*) with the firm of Blohm & Voss. The vessel is one of the two ships provided for in this year's estimates which the Admiralty provisionally ordered before the Reichstag voted supplies.—*Page's Weekly.*

GREAT BRITAIN.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Superb	18,600	Newcastle.	Under trial.
St. Vincent	19,250	Portsmouth.	Launched Sept. 10, 1908.
Collingwood.	19,250	Devonport.	" Nov. 7, 1908.
Vanguard	19,250	Vickers.	" Feb. 22, 1909.
Neptune	20,000	Portsmouth.	Building.
Armored Cruisers.			
Indefatigable	18,000	Devonport.	Building.
Cruisers.			
Boadicea	3,350	Pembroke.	Under trial.
Bellona	3,400	"	Launched March 20, 1909.
No. 1	3,400	"	Building.
Liverpool	4,800	Vickers	"
Bristol	4,800	Brown & Co.	"
Gloucester	4,800	Beardmore.	"
Newcastle	4,800	Armstrong.	"
Glasgow	4,800	Fairfield.	"

With the entry into service of the Téméraire on May 15, Great Britain has three (3) *Dreadnoughts* actually ready for battle; also three (3) *Invincibles*. No other nation has completed either a *Dreadnought* or an *Invincible*.

THE NAVY ESTIMATES.*—The estimates for 1909-1910 amount to £35,142,700, as compared with £32,319,500 for the current year. The principal increases occur under the heads of Pay of Personnel, Victualing, Ordnance, Works and the three sections of the Shipbuilding Vote.

New construction for the year will cost £8,885,194, as against £7,545,202 for 1908-1909. £6,599,424 will be spent on a continuation of work of ships already under construction, and £2,285,770 for beginning work on ships of the new program, for which financial provision is made in the estimates as follows:

4 Battleships (*Dreadnought* type),
6 Protected cruisers,
20 Destroyers

and a number of submarine boats, for which a sum of £500,000 is allowed. In addition to this it is foreshadowed that it may be necessary to prepare for the rapid construction of four more large armored ships, beginning on April 1 of the following financial year. Parliament is asked to entrust the Lords of the Admiralty with powers to do this effectively by ordering and collecting material of various descriptions.

Between April 1, 1908, and March 31, 1909, the following ships will have been completed and become available for service:

3 Battleships, *Lord Nelson* (delayed from previous year), *Agamemnon* and *Bellerophon*.
4 Armored cruisers (*Indomitable, Inflexible, Invincible* and *Defence*).
5 Destroyers, *Tribal* class (three delayed from last year).
17 First-class torpedo-boats (coastal destroyer type).
7 Submarines.

On April 1, 1909, there will be under construction:

6 Battleships.
1 Armored cruiser (*Invincible* type).
2 Unarmored cruisers.
5 Second-class protected cruisers.
25 Torpedo-boat destroyers.
6 First-class torpedo-boats (coastal destroyer type).
19 Submarines.

* Abstract of Mr. McKenna's statement explanatory of the Navy Estimates, 1909-1910.

The long continuance of the labor disputes in the private shipbuilding yards has seriously delayed the progress of most of the ships that were under construction during the year.

The possibility of constructing floating docks for the repair of men-of-war of various sizes, and the question of the use of dirigible airships are matters which have been under consideration. It has been decided to carry out experiments regarding the latter, and to construct an aerial vessel.

An installation of wireless telegraphy has been put up at the Admiralty-office in Whitehall, which, in conjunction with the system of wireless stations under Admiralty control, enables communication to be maintained with H. M. ships at sea.

WORKS.

The arrangements for the transfer of the torpedo factory from Woolwich to Greenock and the torpedo range from Weymouth to Loch Long are being worked out. The contract for the graving dock, closed basin and entrance lock to be constructed at the new naval base at Rosyth has been let, and is to be carried out in seven years. Property has been acquired a few miles above Rosyth on the north shore of the Firth of Forth for the establishment of a magazine depot.

ORDNANCE.

Guns.—The new 12-inch breech-loading gun has satisfactorily carried out range and accuracy trials with improved ballistics over former designs. An improved 4-inch breech-loading high-velocity gun has also been introduced and has proved very satisfactory. *Ammunition.*—Improved types of heavy and medium projectiles, giving greater ranging and increased penetration, have been adopted, and a satisfactory type of heavy high-explosive shell has been evolved. *Cordite.*—The arrangements for artificially cooling the magazines in ships are progressing satisfactorily. Improved methods of manufacturing the explosive have been adopted by all cordite-making firms. *Gun machinery.*—The gunnery trials of the *Invincible* have taken place and are interesting from the fact that this is the only ship in the service having the 12-inch guns worked by electric power. *Fire control.*—Further experiments have been carried out for improving existing methods of directing gun-fire, both by day and by night. *Gunnery training and practice.*—The gunnery practices have generally shown an improvement over those of previous years. *Torpedoes.*—Considerable progress has been made in further developing the torpedo. Very satisfactory results have been obtained both in increasing range and speed. *Wireless telegraphy.*—The provision for all ships of wireless telegraphy instruments of improved design and power has made good progress, and satisfactory results have been obtained.

FUEL FOR THE FLEET.

Coal.—Steps have been taken to provide a new coaling depot at Devonport. A scheme has been approved for reclaiming land and erecting coal storage sheds on the Kowloon side of Hong-Kong. Arrangements have been made for the storage of Welsh coal at certain Japanese ports. *Oil fuel.*—A number of storage depots at the home and Mediterranean ports will be completed and brought into use during the coming year.

NEW CONSTRUCTION.

Battleships.—The *Agamemnon*, *Lord Nelson* and *Bellerophon* have been completed and placed in commission. The trials of the *Téméraire* are in progress, and those of the *Superb* will shortly take place. The *St. Vincent*, *Collingwood* and *Vanguard* have been launched, and the *Neptune* has been laid down at Portsmouth. *Armored cruisers.*—The three cruisers of the *Invincible* class have passed successfully through their steam and gun trials, and the speeds obtained on the measured mile have been, in all three ships, over 26 knots. The *Indomitable* and *Inflexible* are in commission, and it is anticipated that the *Invincible* will be delivered before the

end of the month. The *Defence* has passed through her trials, and the improved *Invincible*—the *Indefatigable*—has been laid down at Devonport. *Unarmored cruisers.*—The *Boadicea* was launched at Pembroke in May, 1908, and the *Bellona* was laid down shortly afterwards. Five larger vessels of equal speed but with heavier armament have been ordered. *Submarines.*—Satisfactory progress has been made with the construction of the submarines which were in hand last year.

MACHINERY AND BOILERS.

The sixteen destroyers of the current year's program will be fitted with turbine machinery, but the boilers have been designed for burning coal instead of oil fuel. Water tube boilers have been, or are being, installed in all armored vessels in course of completion or under construction. The turbine propelling machinery fitted in the *Dreadnought, Indomitable* and other vessels continues to give satisfaction, and propelling machinery of this type is being fitted in all ships now under construction. *Liquid fuel.*—During the year the oil-burning appliances have been completed in the armored vessels *Shannon, Minotaur, Indomitable, Inflexible, Agamemnon, Lord Nelson, Majestic, Cæsar, Magnificent* and *Victorious.* All armored vessels under construction are being fitted to burn oil in conjunction with coal in the boilers as an alternative fuel, the full power being obtainable in these vessels by the use of coal only.—*The Engineer.*

EXTRACTS FROM THE FIRST LORD'S STATEMENT.—A full report has recently been presented to the Admiralty from the flag officers who have been in charge of the vessels manned by nucleus crews on the system, which has now been at work for some four years. The reports received are of a most favorable character, and all the flag officers concerned agree that the nucleus crew system ensures a readiness for war and a general efficiency which has never before been obtained—at least since the introduction of steam machinery into the navy. It must be remembered that before the introduction of the nucleus crew system such ships as were not fully manned were entirely without officers or crew, and left laid up in the dockyards, which they never left until their turn came for full commission. Now, on the other hand, the ships are taken to sea for cruising and gunnery practice, and are thus kept in a state of working efficiency that could not otherwise be contemplated. The chief advantage, however, obtained under the system of nucleus crews is the greatly increased proficiency in gunnery due to the more permanent association of the principal officers and men with the ship and her armament. The recent battle practice returns are a most satisfactory evidence of this.

The Board are giving careful attention to the possibility of constructing floating docks for the repair of men-of-war of various sizes. The idea, of course, is no new one, but the serious want of dock accommodation for our biggest ships on the east coast, and the long time that the construction of permanent works on shore is bound to take, justify an exhaustive investigation of the question, whether the provision of floating docks at certain of our ports would not be an advisable step. Floating docks possess the great advantage of mobility, and for torpedo-craft they could probably be used with safety at several ports where they are much needed. There are, however, unquestionably great difficulties in the use of floating docks for the repair of big ships. On the English coasts the large rise and fall of tide makes the safe moorings of floating docks in close proximity to a dockyard or a shipbuilding center a very serious problem, and the depth of water needed is so great that a considerable amount of dredging would be necessary in many localities.

The *Vanguard*, the third of the *St. Vincent* class, was launched on February 22. Her dimensions are 500 by 84 by 27 feet draft, with an approximate displacement of 19,250 tons. Her estimated speed is 21 knots, and her armament consists of ten 12-inch and a number of 4-inch guns.

The *Vanguard* bears one of the most famous names in the annals of the British Navy—a name which, with the launching of the present bearer, has been borne by nine ships. The first, a vessel of 500 tons, built at Woolwich in 1516 and carrying an armament of eight demi-cannons, ten culverins, fourteen demi-culverins, with twenty-two smaller guns, was the flagship of Sir William Winter during the fighting with the Spanish Armada, which culminated in the final defeat of the Spaniards in the battle off Gravelines on July 28, 1588. The second, a vessel of 650 tons, was Sir Richard Hawkyn's flagship in the expedition against Algiers in 1621. The third took part in the battle off Dungeness, when Blake was defeated by Van Tromp; in the three days' battle with the Dutch off Portland and Beachy Head (February 18-20, 1653) she bore the flag of General Monck, and as the flagship of Vice-Admiral Jordan took part in the two days' battle off the Forelands on June 2 and 3 of the same year, when the Dutch, under Van Tromp and Ruyter were decisively defeated, and in the final battle of the war on August 1, when the Dutch were again defeated, and Van Tromp was killed. The fourth *Vanguard*, a ninety-gun ship, built in 1678, was present at the battle of Barfleur, and was lost in the great storm in November, 1703. The sixth of the name was a seventy-four-gun ship, built at Gravesend in 1787, and was Nelson's flagship at the battle of the Nile the following year. The last *Vanguard* was an ironclad built in 1869, and was lost by collision in a fog with her sister ship, the *Iron Duke*, when, with the First Reserve fleet, she was steaming down the Irish Channel; she sank in a little over an hour, all her crew being saved, the sea fortunately being quite smooth.—*United Service Institution.*

In connection with the launch of the *Bellona* on March 20, it is interesting to note that the first vessel of that name was a French frigate of thirty-six guns, which was captured in 1747 by a British squadron, and in the year following took the twenty-two-gun privateer *Grand Biche*. The name was next given to a seventy-four-gun ship of the line built in 1760, whose first captain was the renowned Robert Faulkner. Under him she engaged, on August 14, 1761, the French seventy-four-gun *Courageux* off Vigo, and this vessel hauled down her colors after rather more than half an hour, having been terribly mauled in the combat. In 1780 the *Bellona* captured the Dutch fifty-four-gun ship *Princess Caroline;* two years later she was in the fight with the Franco-Spanish fleet after the relief of Gibraltar; in 1795, in company with the *Alarm*, she captured the French frigate *Duquesne;* she was present at the reduction of Trinidad in 1797; assisted at the capture of a French squadron of frigates in the Mediterranean in June, 1799; and in 1801 was present at the battle of Copenhagen. Though not at Trafalgar, the *Bellona* figured in Admiral Strachan's action in November, 1805; and in September, 1806, she assisted in the destruction of the French *Impetueux*, seventy-four guns, near Cape Henry. In 1809 she took part in the reduction of the Island of Walcheren, and also was with Cochrane's fleet in Aix Roads when a detachment led by the admiral destroyed four of the enemy's vessels; while in the following year a Danish fourteen-gun privateer fell a prize to her in the North Sea. She was broken up, after a career extending over half a century, in 1814. The name did not appear in the lists again until 1890, when it was bestowed on a third-class cruiser built at Newcastle, which was sold out of the service in 1906.—*United Service Gazette.*

NEW SHIPS.—Of the four battleships certainly to be laid down this year, one will be built at Devonport, one at Portsmouth and the other two by private firms. These battleships are to be of the *Neptune* type, but improved, chiefly in respect to the disposition of their 12-inch guns, all ten of which will be able to fire on either broadside. The two amidship gun-turrets will be placed in *échelon* and the deck erection reduced, so that the two guns on the starboard side may be fired across the deck on the port

beam, and the port guns may similarly be fired on the starboard beam. Two barbettes will be arranged in the center line of the ship aft; the two guns in the turret nearer the center of the ship will be at a higher level than those in the aft turret. The ships will have a heavy auxiliary armament for repelling torpedo attack. The propelling machinery is to be of the turbine type, and the speed will be 21 knots.

Two of the cruisers will be built at Pembroke (one has already been begun), and will be of the *Bellona* class—385 feet long, 41 feet 6 inches beam and of 3360 tons displacement at 13 feet 6 inches draft, when with 18,000 horse-power, developed by turbines, the speed will be 25 knots. The other four, to be built by private firms, are likely to resemble the *City* type; five recently ordered cruisers—430 feet long, 47 feet beam, displacing 4800 tons at 15 feet 3 inches draft, when, with 22,000 horse-power, the speed will be 25 knots. But these four new ships will not be laid down until November of this year. There is intention also to defer to defer the building of the destroyers.

The two battleships to be built by private firms have been ordered from Palmer's Shipbuilding & Iron Co., Jarrow-on-Tyne, and Scott's Shipbuilding and Engineering Co., Greenock. They are to be named *Colossus* and *Hercules*.

NAVAL QUESTIONS IN PARLIAMENT.—*Armaments of New Ships.*—Mr. Ashley asked the First Lord whether the contention of the Admiralty that the British *Dreadnought* battleships of the 1909-1910 program will be 30 per cent stronger than their predecessors, was intended to apply to the offensive powers of the vessels concerned, and whether the new British vessels will have a total weight of fire on the broadside of 8840 pounds, while the broadside fire of the earliest German *Dreadnought* battleships is 9912 pounds and of the United States battleships of the 1909 program and for the Brazilian battleships now building in this country, 10,200 pounds.

Mr. McKenna: While not accepting the figures enunciated, it is undesirable in the public interest to afford any further information with reference to the armament and the offensive power of the new British battleships.

Destroyers.—Mr. Arkwright asked what destroyers approximately would be in the possession of Great Britain, France and Germany, respectively, in March, 1912, capable of efficient work in the North Sea as regards coaling and sea-keeping capacity.

Mr. McKenna replied: Of ships launched in or since 1903, or provided in recent programs, Great Britain has a total of eighty-one destroyers of from 540 to 990 tons, with the *Swift* of 1800 tons and two just purchased from Messrs. Palmer; making eighty-four altogether. Germany has seventy-two of from 400 to 660 tons; France has sixty of from 298 to 703 tons. Of older destroyers Great Britain has sixty-five 30-knotters launched between 1895 and 1901, of from 310 to 470 tons, and the *Velox*. Germany has twenty-four, launched between 1897 and 1902, of 394 tons. France has sixteen, launched between 1899 and 1902, of from 295 to 306 tons. I have not referred to the forty 27-knot British destroyers of earlier date.

The Two-Power Standard.—Mr. C. Craig asked whether it was the policy of the government to take into consideration the navy of the United States of America when estimating the number of ships necessary to maintain the two-power standard.

Mr. McKenna replied: This is an academic question, as under existing conditions the navy of the United States of America for the practical purposes of the two-power standard as defined in my right honorable friend's speech on the Navy Estimates, would not enter into the account. The Prime Minister explicitly defined how he regarded the two-power standard, and I have nothing to add to his statement.

The Royal Marines.—Mr. Nacnamara stated that while the government had no intention of destroying the royal marines, yet it could not be denied that the changes which were going on in regard to ships would necessitate

certain changes in the particular character and function of those who went aboard them. A comparatively much larger personnel was now required in the engine room than formerly. Whether the change in the nature of the ships themselves might ultimately effect some change in the constitution of the royal marines he could not say, but the Admiralty would always desire to treat that force with the greatest consideration and sympathy.

Mr. Lambert explained that the reduction of the royal marines was merely something which was going on in view of the variation of the personnel of the fleet. In the case of cruisers of the *Invincible* type, there was a very much larger number of stokers in proportion to seamen than upon vessels of the older types. The proportion of marines was 25 per cent of the number of seamen carried. Consequently, as the number of seamen was reduced the number of marines was reduced also. In addition there were a certain number of vessels, such as destroyers and submarines, which had recently been multiplied, which did not carry marines at all. That being so, the number of marines was gradually being reduced—not from any change of policy or from any wish to injure that splendid force—but because the Admiralty did not require the same number of marines to form the complement of a ship.

Replying to Captain Craig, who asked what were the number of all ranks of the royal marines in March, 1904, and 1909. Mr. McKenna stated that the number in 1904 was 20,117. The total number in March, 1909, was not available, but the number voted for 1908-1909 was 18,463, and for 1909-1910, 17,719.—*United Service Gazette.*

From the trials of the *Boadicea,* which are now in progress, the authorities should obtain considerable data of value for use in designing the two new vessels of this class which are provided for in the Navy Estimates, if not, indeed, for the four of the *City* class as well. The points of difference between the two types extend even to nomenclature, for while the *Boadiceas* are classed in a new list of "unarmored cruisers," the *Bristol* class are grouped with the already built second-class cruisers of the protected type. Owing to various modifications in the original design of the *Bristol* and her sisters, their construction was temporarily held in abeyance, but the *Liverpool,* if not more, has been laid down. Their reported armament is two 6-inch and ten 4-inch guns, which, if correct, is considerably more powerful than that mounted in the *Boadicea.* Meantime, the latter vessel has almost completed her series of trials. An average speed of twenty-five knots was maintained on the thirty hours' high-power trial, at one stage of which the cruiser reached 26.7 knots. The eight hours' full-power run was begun, but owing to slight trouble being experienced with the turbines, was stopped for the necessary adjustment of machinery. This is the second trial that has had to be prematurely concluded, as the first attempt at thirty hours at one-fifth power was stopped by unfavorable weather. A resumption of the eight hours' trial was made from Plymouth, where also the gun trials took place. From each gun five common shells were fired, the guns being set to the maximum recoil, and the shock to the gun-mountings and adjacent structure was considered trifling. Equally satisfactory were the steering, circle turning and anchor trials.—*United Service Gazette.*

WARSHIP BUILDING CAPACITY OF PRIVATE SHIPYARDS.—Sir Andrew Noble, at the Armstrong meeting, pointed out that Elswick could, if need be, deliver three *Dreadnoughts* in two and one-half years from the date of the order, and could continue delivery at the rate of three vessels each fifteen subsequent months, while with a little notice and continuous orders his firm could produce four *Dreadnoughts* annually. Colonel Vickers at Sheffield said that his firm could lay down and complete, arm and fit ready for service in every respect, three battleships of the *Dreadnought* type in three

years from the date of approval of the drawings, and if necessary thereafter it could deliver *Dreadnoughts* complete for service at the rate of one every six months, in addition to existing contracts and to current orders for different classes of smaller vessels. The power of production of this firm in artillery equipment is adequate for the outfit complete of seven *Dreadnoughts* in three years, in addition to the usual orders to be expected from foreign countries. These are only two of the firms engaged in similar work throughout the country.—*Army and Navy Gazette.*

The unusual nature of a recent court-martial at Devonport, by which a lieutenant was reprimanded and dismissed from his ship for making use of a disparaging expression about a senior officer, has naturally given rise to some discussion in naval circles, where in some quarters it is held that the sentence is too severe. Without a fuller knowledge of all the circumstances than has been reported, it very difficult for outsiders to sit in judgment on the matter. What is interesting is that exactly a hundred years ago an occurrence, similar in its circumstances, though not precisely on parallel lines, took place in the fleet in the Basque Roads under Admiral Gambier. Lord Cochrane, then in command of the *Imperieuse*, had been selected by the Admiralty to be in charge of the fireships in the projected expedition of Aix Roads, and his appointment was the subject of some criticism, partly because he was junior to all the other captains in the fleet. The prevailing discontent was shared by the second in command, Admiral Eliab Harvey, who, as a captain, had commanded the *Téméraire* at Trafalgar. Speaking to Cochrane in Sir Harry Neale's cabin, Harvey made use of the following words:

"This is not the first time I have been lightly treated, and that my services have not been attended to in the way they deserved; because I am no canting Methodist, no hypocrite, no psalm-singer and do not cheat old women out of their estates by hypocrisy and canting! I have volunteered to perform the service you came on . . . . but am very sorry to have a junior officer placed over my head."

The epithets "hypocrite" and the like had reference to the religious views of Admiral Gambier, who was known to be a "Low Churchman of the aggressive type." Shortly afterwards, on the quarterdeck of the flagship, Harvey continued his commentary on the conduct of the admiral, in the presence of Captain Bedford, and in a tone which attracted the attention of every officer within hearing. As a result he was tried by court-martial on May 22, 1809, and dismissed from the service, though early in 1810 he was reinstated in his rank and situation, and in 1825 was made a Grand Cross of the Bath by William IV.—*United Service Gazette.*

DISABILITIES OF ENGINEER OFFICERS.—The statement "of the disabilities under which the engineer officers of his majesty's navy labor, which they consider should be removed, and the reforms which they regard essential to the proper organization of their department for war," is a much more reasonable and moderate document than has sometimes been issued in the name of this grade of officers. It is admitted that since 1902 the following concessions have been made, and have effected improvement in the conditions of the service of engineer officers: (1) the granting of semi-military titles, (2) a slight acceleration of promotion, (3) a small improvement in pay, and (4) facilities for earlier retirement and the institution of four good service pensions. Compared, however, with the officers of the military branch, the engineer officers assert that they receive age for age, lower rank and pay, and their contention is that as the engineer officers of the future are to have these disabilities removed, so also, and in order to ensure the success of the new training scheme, the engineer officers of the present day should receive similar treatment. The points which they advance for settlement as essential to the attainment of the highest efficiency in their department are eight in number, but of these,

several would follow automatically if the first, viz., that the engineer branch should be included in the military branch, was conceded. They would then necessarily obtain such disciplinary powers as are vested in executive officers of similar rank. The distinction in uniform would be abolished, they would sit as other executives on courts-martial and they might attain to the highest posts open to naval officers of the military branch. Perhaps the most interesting of the eight points is that in which is suggested the institution of a school of engineering, and it will be interesting to hear what is said about this subject when the matter is discussed, as no doubt it will be, in Parliament.—*Army and Navy Gazette.*

NAVAL ACCOUNTANT OFFICERS.—In a recently issued circular letter the Admiralty announce important changes which are to take place with regard to accountant officers who enter the service in or after the year 1909.

"The intention is to place the training and qualification of these officers on a more systematic basis and encourage young officers to obtain a knowledge of their profession by extending to the accountant branch the system of accelerated promotion which is already in force in the case of junior officers of other branches of the service. Officers who pass their examination for assistant paymaster with credit will have their advancement to that rank antedated, and the ability displayed during their early service will thus have a direct influence upon their future career. Twelve months after entry, or as soon after as they are certified as likely to make good accountant officers, assistant clerks are to be rated clerks, but if an assistant clerk fails to obtain his certificate for advancement within 18 months, an inquiry is to be held, and if unfavorable to the officer he will be liable to discharge from the service. Reports are to be made at the end of one year's service as assistant clerk, and at the end of two years' and three years' service respectively as clerk and assistant clerk. The examination for assistant paymaster will be held at the end of three and a half years' service, providing the officer has a certificate stating him deserving of promotion. Candidates who obtain a third-class certificate will be promoted to assistant paymaster on completing three and a half years' service, and those who obtain a second-class or first-class will have their promotion accelerated by three months and six months respectively. Candidates who obtain less than 40 per cent of marks in any one subject or 50 per cent of total marks, will fail, and will lose three months' time, but will be given a further trial at the end of that period, a second failure rendering them liable to discharge from the service. Officers will not be eligible for promotion to paymaster or for the appointment of assistant paymaster in charge unless they have passed an examination, which may not be taken until three years after passing for assistant paymaster. Officers who fail may be examined again, but not earlier than six months from date of failure."

INCREASE OF PAY FOR COMMANDERS.—It is announced in the *London Gazette* that the King by an order in council has sanctioned proposals, to take effect from April 1, that the full pay of commanders shall be at the rate of 22s. a day, and half-pay at the rate of 11s. 6d. a day for the first 185 commanders on the list, and 10s. a day for the remainder.

TRAWLERS FOR PICKING UP MINES.—The fleet of five modern steam trawlers which the Admiralty purchased recently are to be utilized for the purpose of discovering submarine mines which may be laid down in time of war. Some time ago two Grimsby trawlers, the *Algoma* and *Andes*, were engaged by the Admiralty, to carry out an extensive series of experiments in the English Channel and the Dover Straits, with a view to ascertaining how far the modern trawl which sweeps the bottom of the sea, is adapted to fish up a submarine mine or to render one useless by dislodging it from its moorings. Dummy mines were laid at various depths by a gunboat, both inside and outside territorial limits, and the experiments of

the two specially-chartered trawlers proved successful. Numerous dummy mines, partly and wholly submerged, were swept up in such a businesslike manner as at once very largely to reduce the offensive possibilities of live mines. Similarly successful experiments were carried out in the northern waters, and particularly in the Firth of Forth and St. Andrew's Bay. The modern trawler, therefore, with certain adaptations, is considered eminently able to fulfill the requirements of the naval authorities.—*United Service Gazette.*

Following closely on the transformation of the *Vulcan* from a torpedo vessel into an armed seagoing depot for submarines, the conversion of the *Onyx* at Devonport to a somewhat similar purpose is now approaching completion. This old torpedo gunboat, belonging to the *Circe* class of eight boats launched in 1892-1893, was one of the vessels struck off the effective list in 1905, and for over two years she lay idle at Portsmouth until the authorities conceived the idea of making use of her as a base for part of the submarine flotilla. Her upper deck has been roofed in, and access to the covered space thus provided is by means of four large ports, two on each side of the ship. Ample ventilation between decks is supplied by steel ventilators which pass through the roof, while in the equipment of the ship generally, measures have been take to ensure that health and comfort which is essential to those engaged in submarine work. With the completion of the *Onyx*, there will be no less than seven vessels specially appropriated to the submarine service as depot ships, a not too large number when it is considered that over fifty British submarines are now afloat, and some two dozen more are building or authorized. Under the new fleet distribution arrangements, the submarines are divided into four "sections," instead of being distributed between each of the three ports as formerly, and a depot ship is allotted to each section; the *Forth* to Section I, the *Bonaventure* to Section II, the *Thames* to Section III and the *Mercury* to Section IV. Then as "additional depot ships" there are the *Hazard*, the first ship to be connected with the submarines, and the recently-converted *Vulcan.*—*Army and Navy Gazette.*

COALING RECORD.—A fine coaling performance, which is believed to be a world's record was recently accomplished by the battleship *King Edward VII*, flagship of Admiral Lord Charles Beresford, commander-in-chief of the Channel fleet, at Portsmouth. The vessel, coaling from C 1 12,000-ton floating depot, took in 1451 tons in a little over 3½ hours, averaging 417 tons an hour. Later in the afternoon Admiral Sir Arthur Fanshawe, commander-in-chief, made the following signal: "To *King Edward VII* and coaling depot C 1—Congratulate you on beating record of the port. Very good evolution."—*United Service Gazette.*

THE NEW MIDSHIPMAN.—In his statement explanatory of the navy program, the First Lord of the Admiralty intimated that a circular letter had been issued to the fleet defining clearly the principles governing the training and instruction of the "new scheme" midshipman, and laying down detail instructions for carrying out that training during the three years the midshipman will serve afloat. A study of this circular letter does not dispel the doubts which engineers have entertained regarding the efficiency of the new system of training, so far as it affects the future management of machinery on board ship. The scheme is sound so far as it is concerned with the general training of officers without distinction; the curricula and subjects of examination have been prepared with great care. But no one can study the details without realizing that what is lacking is provision for that practical experience which can only come with direct contact with problems and *matériel.*

The Osborne course need not be dealt with here. It follows generally the lines of the leading educational institutions which aim at affording a

liberal education to the earnest and studious youth, and the authorities have very properly determined that during this course at Osborne, as well as that at Dartmouth, there shall be no specialization. The scheme, the First Lord points out, is being carried out satisfactorily, the only slight modification made being that a greater number of cadets are required to take up the study of German as well as French, so that a larger number of officers will be grounded in the former tongue, in order that the supply of interpreters in German shall be increased. As is known, the cadet spends four years and eight months in the colleges and on board the training cruisers, and at the end of this period the cadet becomes a midshipman, and will undergo a three years' training afloat, in order to provide "sufficiently for his thorough knowledge of the practical work of his profession." He thus avoids the necessity for the present courses in gunnery, torpedo and pilotage prior to the examination in these subjects for the rank of lieutenant. The duties of the new naval instructors appointed to ships carrying the "new scheme" midshipmen will be generally as follows: To superintend the observations and the working out of the ship's position every day at sea by those midshipmen who are not attached to the navigating officer; to assist the specialist officers with the theoretical instruction of the midshipmen in the various professional subjects; to encourage voluntary study, and to help the midshipmen who wish to keep up and improve their educational acquirements; to assist any commissioned officers who desire to work up for specialization. During the three years' course annual examinations will be held, the papers being sent down from the Admiralty relating to all the subjects of the compulsory parts of the examination for lieutenant. The examinations will be framed to test the experience gained in the practical side of professional work; but special advantages will be offered to those who also take up the theoretical side.

It is with the provision for acquiring practical experience that we see possibilities of failure. During the three years' service at sea the midshipman will work with the executive officer for training in officer's duty and seamanship, and with the specialized officers for training and instruction in gunnery, torpedo, navigation and pilotage, and in engineering. The apportionment of the time to be allotted to each subject is to be left for the present with the commanding officer, but "about one-third of the whole time is to be spent with the engineer officer." Again, the periods of instruction in each subject "are to be arranged so that the time devoted to any particular branch shall not be so long as to entail any risk to the midshipman getting out of touch with other branches of their professional work." This last proviso is, in itself, an admission of the weakness of the scheme. It may be taken that the three years' course is analogous to works apprenticeship following upon a liberal education, and it would seem as if the Admiralty, although responsible for the drafting of the system, failed to recognize the extreme danger of the apprentice attempting too much within a limited period. We are prepared to admit that every effort will be made to utilize the time available to the fullest advantage. It is laid down that officers, and not seamen instructors, are to be employed, that the midshipman is not to be asked to do any ship's clerical work and that every opportunity is to be given for studying the work done under the best guidance. We have no fault to find with the arrangement in so far as it affects the purely military officer—or, indeed, the navigating officer—and it is conceivable that a sufficient knowledge may be gained of gunnery and torpedo work. But there is still room for doubt as respects these two latter, in view especially of the multiplication of mechanical details of extreme delicacy, and the rapid development in these branches of applied science. As regards engineering, we are satisfied that one year's practical experience is absolutely inadequate, especially as the indications point to the work being largely observational.

The midshipman, for instance, is during this period expected to become

closely acquainted with the practical work of the engineering department, "learning the methods and practice adopted in harbor for the care and maintenance of machinery, as required to keep it in good order; and acquiring the knowledge and experience under way which will enable him, by the time he comes up for examination, to take the duty of engineer officer of the watch." He is to "see" such repair work as is going on in any department and take part in the examination of the hull and machinery. He is also to take advantage of such opportunities as present themselves of "seeing" engineering operations in the dockyards. He is to keep a note-book with descriptions and detailed sketches of parts of machinery, etc., and with accounts of any repairs he may "witness," and the reasons for the repairs. An examination of this book is to be included in the final test for lieutenancy.

A serious deficiency in the scheme, as enunciated by these extracts from the circular letter, is the absence of practice. Assuming that a number of the midshipmen will anticipate the ultimate choice of engineering as their specialty in later years, and will early apply themselves with diligence and determination to acquire the fullest knowledge and experience, the period is too short and the method too nebulous. One might as well expect the medical student to become an adept in surgery by a close observance of such masters as Treves or Horsley; it will be universally admitted that a thousand years of such observation would fail to give the student that intimate knowledge, courage and deftness which alone come with practice. Similarly, the embryo physician in attendance at a hospital can never acquire intimate knowledge of the ailments of the human organism without being permitted to diagnose cases even under the eye of his teacher. The mechanism of a ship is recognized as parallel to the organism of the human body; its intricacies are as great, and its possible ailments as numerous, and the engineer has not the same advantage as the doctor of a personal interview with the patient.

The public would look askance at any attempt on the part of shipowners or the Board of Trade to grant a watchkeeping certificate to anyone, however liberal his preliminary education, who had spent only one year watching others driving and repairing the machinery of a merchant ship. The entrusting of the machinery of a vessel, even of the cargo type, to such a one would be courting disaster, and would almost result in a charge of culpable negligence. In the merchant service an apprenticeship to engineering is regarded as an essential preliminary to sea experience, and this latter must be extensive before a certificate is granted, or before responsible owners of a passenger ship would entrust the duties of watchkeeping. In the navy, on the other hand, the preliminary training, however, satisfactory, is not specialized; yet the Admiralty regard it as possible that one year's observational experience suffices to justify them in granting at watchkeeping certificate. In the merchant service life is at stake; in the naval service the national safety may be jeopardized.

In measuring the time necessary to gain experience, it must be remembered, too, that in the navy, to a far greater extent than in the merchant service, the engineer must keep pace with contemporary knowledge; the same, indeed, applies to the gunnery and torpedo student. Consequently, the acquisition of knowledge of what is going on on board ship is not sufficient training. Attention must at the same time be devoted to contemporary developments. No doubt, following upon specialization, the lieutenant would be required to make a study of such developments; but, as shall presently be pointed out, the age at which specialization takes place is somewhat beyond the period of enthusiasm in the acquisition of knowledge, especially if one has been forced into a profession instead of voluntarily choosing it as a consequence of personal predilection.

After the three years' sea training, during which the commanding officer, in apportioning the time for training in the various subjects, plays with the midshipman the game of battledore and shuttlecock, the young man is

required to sit for final examination to qualify for the rank of lieutenant. This examination will consist of six parts; five—seamanship, navigation and pilotage, engineering, gunnery and torpedo—being compulsory. Two voluntary subjects must be taken, the list including practical mathematics, mechanics and heat, electricity, advanced French or German, another foreign language and naval history. A first-class in any of the six parts, two voluntary subjects being one, will count two marks, and a second-class one mark. Should the midshipman get all twelve marks, he will only require to serve nine months more as a sub-lieutenant before reaching the rank of lieutenant. The period of additional services increases with decreased marks. If five marks are not secured, the officer will be sent to sea, and must present himself on the next occasion for examination in the subject or subjects in which he has failed, losing two months' time in respect of each subject in which he has failed. A second failure will entail the liability of removal from the service. The engineering part of the examination is to be carried out by officers nominated by the commander-in-chief at Portsmouth, after communication with the engineer-in-chief and the director of naval education. No exception can be taken to the machinery for examination: all depends on the test; and here also it must be admitted that the scope of the curriculum in engineering is comprehensive.

The minimum time of training afloat for the rank of lieutenant is thus three years and nine months, the maximum being about five years. But of the second period of from nine months to two years, one-half must be spent as an officer of the watch on deck. The proportion of time to be spent in the engine room is not stated. After becoming a lieutenant, officers will be selected to specialize in one or other of the various branches of gunnery, torpedo, navigation or engineering, and will attend a course of two terms (approximately six months) at the Royal Naval College, Greenwich. "This course of instruction will comprise such studies as will fit the officers to prepare for the practical courses of specialization." There is no indication as to whether the Admiralty will themselves select or give option to the officers to choose which department of the service they will enter.

It is significant that before requiring to specialize the lieutenant has become twenty-one or twenty-two years of age, and up to that point his training has been so varied that it will be difficult for him to cultivate an an enthusiasm for any one department. Under the old conditions the engineer student was brought into direct contact with constructional engineering, repairing engineering and with the management of machinery on board ship from his entry into the service as a lad. He grew with and became almost part of his profession, acquiring much resourcefulness in dealing with every possible contingency on board ship, and developing a courage which is of incalculable benefit to the engineer in dangerous emergencies. "Specialization" is a watchword of progress and anyone who attempts a general knowledge and practice of everything to the neglect of a full knowledge of something, whether he be scientist, chemist, surgeon or engineer, cannot hope to advance in his profession or to serve his generation, however, estimable he may appear as a universal exponent of surface knowledge, or as a provider of articles invented or discovered by others.

It seems absurd to require the young man who intends to become an engineer to waste his time in mastering minute details of rigging, boat-landing, navigation, signaling, or, indeed, ancient naval history. These should be more or less voluntary; they may be desirable in the interests of relaxation. But as soon as a liberal education is completed—such an education as is no doubt afforded at Osborne and Dartmouth—the youth ought to be encouraged or required to specialize before he loses the first sharp edge of the desires of ambition. These are but truisms, and when one recalls them it seems the more surprising why the radical changes embodied in the scheme should be brought into a branch of the service which

has always been exemplary in its efficiency. Moreover, the requirements of engineering are becoming more and more exacting. The intricacies are increasing, the extent of special knowledge is being intensified, and, consequently, the preparation for practical work requires longer time, greater enthusiasm and more continuous concentration. Unless modification is made at an early date as the result of experience, there is grave danger that the practical work of engineering on board ship will devolve upon the mechanics and artificers, and recent developments do not justify faith in their possession of such knowledge of thermodynamics or mechanics as is necessary to ensure the efficiency of the propelling machinery on board ship, and this—it is not necessary to enforce—involves the efficiency of the naval defence of the country.—*Engineering.*

ITALY.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Roma	12,625	Gov't Yard, Spezia.	Under trial.
Napoli	12,625	" " Naples.	" "
Dante-Allighieri	19,000	" " Castellamare.	Building.
Léonardo da Vinci	19,000	" " Spezia.	"
Armored Cruisers.			
San Giorgio	9,800	Gov't Yard, Castellamare.	Launched July 27, 1908.
San Marco	9,800	" "	" Dec. 22, 1908.
Pisa	9,800	Orlando Works.	Under trial.
Amalfi	9,800	Odero Works.	" "
B	9,800	Leghorn.	Building.

The armored cruisers *Pisa* and *Amalfi* are undergoing their trials. The former has attained a maximum speed of 23 knots; the latter 22.5 knots. It is expected that the *San Giorgio* and *San Marco* will be ready for active service in June, 1910. The trials of the *Roma* are nearly completed.

JAPAN.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Satsuma	19,200	Yokosuka.	Launched Nov. 15, 1908.
Aki	19,800	Kure.	" Apr. 15, 1907.
A	20,000	Yokosuka.	Building.
B	20,000	Kure.	"
Armored Cruisers.			
Ibuki	14,600	Kure.	Launched Nov. 21, 1907.
Kurama	14,600	Yokosuka.	" Oct. 21, 1907.
Protected Cruiser.			
Tone	4,100	Sassebo.	" Oct. 24, 1907.

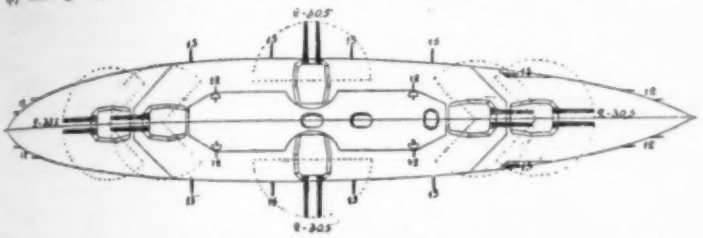
NAVAL STRENGTH OF JAPAN.—Speaking in the naval section of the Budget Committee, his excellency Baron Saito made an interesting statement as to the actual condition and prospects of the navy.

According to this statement there are now on the active list of the Japanese Navy thirteen battleships, twelve armored cruisers, forty-three other cruisers, fifty-nine destroyers and sixty-nine torpedo-craft, making the total of all classes in actual service one hundred and ninety-six.

The ships in course of construction are the *Ibuki*, armored cruiser, to be completed in 1909; the *Kurama*, armored cruiser, 1911; the *Tone*, dispatch boat, 1908; the *Aki*, battleship, 1911, and the *Satsuma*, battleship, 1909.

In addition there are projected two battleships, three armored cruisers, one second-class cruiser and two submarines.—*New York Times.*

According to the *Moniteur de la Flotte*, the battleships *A* and *B* have been begun, the former in December, 1908, at Yokosuka, and the latter on January 18, 1909, at Kure, their characteristics being as follows: Displacement, 20,000 tons; length, 146.4 meters; beam, 25.9 meters; draft, 8.5 meters; speed, 20 knots; armament, twelve 12-inch, ten 5.9-inch and twelve 47 inch guns, arranged as shown on the accompanying diagram.



It is possible that the ship hitherto carried in the PROCEEDINGS' NOTES as the battleship *Huki*, of 19,800 tons, building at Yokosuka, is really one of the three projected armored cruisers of about 15,000 tons, though it may be that that is the name to be given to battleship *A*.

Baron Saito stated further that the government yards at Kure and Yokosuka, which could each build two large ships at once, were intended to build all the battleships and armored cruisers, while the government yards at Maizuru and Sassebo were intended to build only second-class cruisers and small vessels. A battleship could be built in two years if every effort were made, but the ordnance would take longer.

GUN FACTORY FOR JAPAN.—Sir W. G. Armstrong, Whitworth & Co., of Elswick, and Messrs. Vickers, Sons & Maxim, of Barrow, have almost completed a joint enterprise in Japan for the erection of large new steel works for gun forgings, and it is understood that the works will ultimately become the property of the Japanese government. They will be carried on under the direction of the Japanese admiralty, assisted by English experts. —*Army and Navy Gazette.*

The Japanese government has placed an order for twenty-four 12-inch guns and suitable mountings with Sir W. G. Armstrong & Co. and Messrs. Vickers, Son & Maxim, each firm undertaking half the work. The total contract, which includes sights and ammunition, involves an expenditure of nearly £600,000, and will take nearly two years to execute. Whatever the capabilities of the Japanese dockyards may be, it is quite certain that their ordnance factories are unable to cope with the demand for armaments; but this condition is shared by various other countries, and there are at least two big continental powers whose programs are effected by this lack of ordnance constructional facilities.—*The Engineer.*

RUSSIA.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Emperor Paul I.....	16,900	St. Petersburg.	Launched Sept. 7, 1907.
Andrei Pervozvannui.....	16,900	"	" Oct. 20, 1905.
Evstafi	12,500	Nicolaiev.	" Oct. 1906.
Ivan Zlatoust	12,500	Sevastopol.	" May 13, 1906.
Armored Cruisers.			
Bayan.....	7,800	St. Petersburg.	Launched Aug. 15, 1907.
Pallada	7,800	"	" Nov. 10, 1906.
Protected Cruiser.			
Outchakoff	6,750	Sevastopol.	Building.

SPAIN.

THE RENAISSANCE OF THE SPANISH NAVY.—No little interest attaches to the fact that the Spanish nation has at length determined upon a scheme for the systematic upbuilding of her navy. In view of the brilliant records of her medieval naval history, there is no reason why, under her young and exceedingly popular King, the Spanish flag should not fly over a modern navy that in everything but size will compare favorably with those of the leading maritime peoples. The scheme of reconstruction contemplates the building at Ferrol of three battleships of about the size of our own *Connecticut*, and the construction at the same place of what will be, in effect, an entirely new naval yard. A similar reconstruction is to be undertaken at Carthagena, where four 800-ton gunboats, three 350-ton destroyers and twenty-four 180-ton torpedo-boats are to be built. The construction of the new docks and of the ships themselves will be undertaken by three leading British firms, and the total outlay will be between $35,000,000 and $40,000,000. The most important part of the new program is three big-gun battleships which, although they are to be of only about 15,000 tons displacement, will have in some respects greater gun-power than the 18,000-ton British *Dreadnoughts*. Each ship will mount eight 50-caliber 12-inch guns of 52,000 foot-tons muzzle energy. Two of these will be forward on the center line, two aft and one on each beam. The two last-named pair of guns, placed *en echelon*, will be capable of firing across the deck, and, therefore, will command either broadside. This will give a concentration of six guns ahead or astern, and eight on each broadside, which provides an all-round fire equal, in the number of guns engaged, to that of the *Dreadnought*, and, because of the more modern character of the guns, considerably more powerful. The ships will carry a 9-inch belt with 7-inch side armor above the belt. The barbettes will be protected by 10 inches of armor, and the battery of torpedo-defence guns will everywhere be protected by 7-inch armor. As a protection to the machinery and magazines against torpedo attack, interior armored bulkheads are to be built into the ship. The ships will stow sufficient coal for a radius of 5000 miles at cruising speed, and they are required to show 19½ knots speed on trial.—*Scientific American.*

UNITED STATES.

VESSELS BUILDING.

No.	Name. *Battleships.*	Speed. Knots.	Where Building.	% of Completion Feb. 1.	% of Completion May 1.
26	South Carolina	18.5	Wm. Cramp & Sons.	78.9	90.0
27	Michigan	18.5	New York Shipbl'g Co.	89.7	97.4
28	Delaware	21	Newport News.	64.1	77.9
29	North Dakota	21	Fore River.	70.6	81.5
30	Florida	20¾	Navy Yard, New York.	3.3	11.9
31	Utah	20¾	New York Shipbl'g Co.	3.1	14.9

THE "WYOMING" AND "OKLAHOMA."—The plans of the two battleships of the United States program for 1909 have been completed. The vessels, which are to be named *Wyoming* and *Oklahoma*, will be of 26,000 tons displacement at normal draft. One of the most remarkable features about them is their beam. This necessitates a great increase of engine power to maintain the 21 knots speed with which previous American *Dreadnoughts* have been equipped. The *Dreadnought* has 23,000 for her 17,900 tons; the American *Delawares* have 25,000 for their 20,000; and it is anticipated that the new ships will require 33,000. The engines will be of the turbine type, either Parsons or Curtis, with four screws if the former and two if the latter design.

The armament of the *Wyomings* will be a distinct advance on that of their predecessors. Twelve 12-inch guns will be carried, all on the center line, and, therefore, capable of firing on either broadside. Two turrets

will be placed forward of the funnels and four aft, and they will be so arranged that four guns can be brought to bear either ahead or astern. The vessels will also have a secondary battery consisting of sixteen 5-inch guns, besides a number of 12-pounders. The main belt will be 11 inches thick amidships, thinning to 6 inches at the ends, while the battery of 5-inch guns will be behind 8-inch armor. The big gun turrets will be 11 and 10 inches thick. Two open-work masts will be carried.—*United Service Magazine.*

The following is a comparison, taken from *The Navy*, of the general features of the *Utah* and *Florida* with those of the *Delaware* and *North Dakota*.

	Delaware and *North Dakota*.	*Utah* and *Florida*.
Length, load water line	510 feet	510 feet
Breadth, extreme	85 feet 2½ inches	88 feet 2½ inches
Displacement on trial	20,000 tons	21,825 tons
Mean draft, trial displ	26 feet 11 inches	28 feet 6 inches
Total bunker capacity	2300 tons	2500 tons
Coal and oil fuel, trial	.....	1933 tons
Coal on trial	1000 tons	.....
Total fuel-oil storage	380 tons	400 tons
Feed water on trial	66 tons	133 tons
Speed on trial	21 knots	20.75 knots

The displacement of the *Delaware* and *North Dakota* will be 20,000 tons, with either vessel two-thirds full of ammunition and stores; that of the *Utah* and *Florida* will be 21,825 tons, with two-thirds supply of stores and fuel, and full supply of ammunition—the new "fighting line" displacement.

ORDNANCE AND GUNNERY. TORPEDOES.

A revolution in naval gun-firing is heralded by the British papers. By the genius of that persistent student of his profession, Rear-Admiral Sir Percy Scott, the laying of guns by the men in the barbettes is to be abolished, and absolute control of a gun or series of guns is to be at the will of one man in the fire-control station. The cruisers *Good Hope, Argyll* and *Arrogant* have been experimenting under Rear-Admiral Scott's superintendence with the invention, which is called a "director." The director's action is entirely electrical. It comprises a series of instruments placed in a foretop, connected with electrical motors in the barbette, which elevate the guns and enable the gunnery officer to fire them simultaneously or separately by the mere pressure of a button. The sighting is done in the usual way, and a range-finder is used. Should the fire-control station in the foretop be disabled the guns can be fired by gun layers, as now.—*Army and Navy Journal.*

NEW NAVAL GUNS AND THEIR SIGHTS.—Apropos of the good scores recently published, showing the excellence of the shooting at long range by a large number of our warships when carrying out battle practice last year, attention may be called to the great progress that has been made in fixing efficient sights to naval guns during the last few years. Telescope sights are now the rule, and glasses of great power and field-compass are attached to the Mark X guns of 12-inch caliber, mounted in all ships of the *Dreadnought* type. To show how efficient this method of sighting has proved, it is sufficient to compare the shooting of the *Indomitable*, a battleship-cruiser of the all-big-gun type, to several ships of the *Majestic* type, which carry much older weapons. The *Dreadnought*, too, made a score that goes to show the great value of good gunsights, especially at ranges

exceeding 7000 yards. Then the rapidity of fire attained from the later guns, by reason of the superiority of the gear which operates them, and the higher muzzle-velocity of the guns which enables a 50 per cent harder blow to be struck, all go to make an *Indomitable* a match for a couple of *Majestics*. The splendid sighting-gear, however, is the great secret of last year's successful shooting.—*United Service Gazette.*

BATTLE PRACTICE IN THE BRITISH NAVY.—The result of the battle practice in the fleet for 1908 has been issued as a parliamentary paper, and the Admiralty, while pointing out that the conditions of the practice presented considerably greater difficulty than in 1907, note their satisfaction that such good results were obtained. It is also stated that owing to the different conditions of the practice the system of calculating the points has been revised, and the points are not directly comparable, therefore, with those of 1907.

		1899	1900	1901	1902	1903	1904	1905	1906	1907	1908
Number of ships that fired...		136	121	127	139	134	108	100	89	121	117
Number of guns.....		1121	1031	1137	1241	1296	1171	1096	1073	1305	1277
Number of hits...	'06 target	2831	2732	3502	4789	5906	5748	4374	6733	7847	
	'07 "									4073	4402
Number of misses	'06 "	6249	5709	6244	6863	7028	7664	3657	2328	1991	
	'07 "									5465	4193
Excess of hits over misses.	'06 "	Nil	Nil	Nil	Nil	Nil	Nil	1017	3405	5556	
	'07 "									Nil	60
Excess of misses over hits.	'06 "	3418	2977	2682	2074	1032	1916	Nil	Nil	Nil	
	'07 "									1392	Nil
Percentage of hits to rounds fired.	'06 "	31.1	32.3	36.3	41.1	46.04	42.86	56.58	71.12	78.13	
	'07 "									42.70	52.57
Hits per gun per minute:											
12-inch and 10-inch.	'06 target	.29	.30	.33	.38	.53	.47	.58	.81	.61	
	'07 "									.40	.56
9.2-inch.....	'06 "	.23	.22	.31	.35	.70	.73	1.40	2.84	3.25	
	'07 "									2.01	2.22
7.5-inch.....	'06 "									3.48	
	'07 "									1.56	2.81
6-inch Q. F. and B. L.	'06 "	1.05	1.51	1.81	2.41	2.63	2.63	4.14	5.68	5.93	
	'07 "									3.32	3.80
4.7-inch and 4-inch Q. F.	'06 "	1.82	1.60	1.93	2.02	2.47	2.28	3.73	4.96	5.73	
	'07 "									2.38	3.22
Number of ships from whom no returns were received...		32	29	47	19	30	43	Nil	Nil	3	1

HYDRAULIC *vs.* ELECTRICAL POWER.—It is a curious fact, to which we have alluded before, that while the American service writers have recently been severely criticizing the electric systems by which their heavy guns are worked on board their battleships and large cruisers, and condemning this system with a wealth of adjectives, the British Navy is only now taking up electricity to a large extent for this same purpose. In the *Bellerophon* some of the turrets are worked by electrical power, while the other turrets are manipulated by hydraulics. Previously, with the exception of the *County* class, hydraulic power has been exclusively used for over a quarter of a century for carrying out all the functions of loading, laying and training the turret guns of the fleet. The experiment on board the *County* class, with their misfit of twin 6-inch guns, was anything but a success, and electrical power was more or less discredited for several years. Now, however, it has been revived and its application extended; for the battleship cruiser *Invincible* has carried out her gunnery trials with the whole of her 12-inch guns fitted with electricity for performing all the functions of loading and working the guns and training the turrets; and has given a fair amount of satisfaction, although it is reported that some weaknessess have been discovered. Exponents of the two systems are not

equal in the navy, as the older gunnery men speak well of the hydraulic system which has carried them over. But it is admitted that the present electrical system is far more safe and reliable than any electrical system which has previously been installed, and it appears to be gaining adherents among the younger generation of gunnery officers.—*United Service Gazette.*

EXTRACTS FROM THE FIRST LORD'S STATEMENT.—*Cordite.*—Cooling machinery for the cordite magazines on board his majesty's ships has now been provided for all completed battleships and cruisers which are likely to be retained on the active list, and for all ships under construction, except destroyers and smaller craft. Great attention has been paid to the safe storage of this propellant, and to the elimination of any lots the stability of which may have deteriorated under storage. Improvements in the methods of manufacturing the ingredients employed in making cordite, which experience has dictated, have been adopted by all cordite-making firms, and it is confidently anticipated that these improvements will tend to secure greater stability and better keeping qualities in the finished product.

Gun-Mountings.—The older types of 12-inch mountings are being brought up to date, and the ships which carry them are gradually being fitted with modern sights and elevating and training control-gear. These alterations will enable further improvements in accuracy of fire with these guns to be obtained. The gunnery trials of the *Invincible* have taken place this year, and are interesting from the fact that this is the only ship in the service having the 12-inch guns worked by electric power. Several of the 6-inch twin mountings and one or two of the older type of 9.2-inch mountings have had some of the operations carried out by electric power, but in this case the whole of the operations connected with loading, training and elevating the 12-inch guns is performed by this power.

The Admiralty have issued a memorandum stating that, as a result of trials of various forms of ear protectors, it has been decided that the form of ear protection to be used during gun fire may be left to the individual choice of the officers and men concerned. A preparation called "Antiphone," which has been tried with satisfactory results, may, the Admiralty state, be supplied to ships and gunnery schools for the purpose if specially demanded, the material being obtained from the medical officer as required by the persons using it. "Antiphone" may be used as supplied, an admixture of cotton, wool or other similar material being considered unnecessary. It should first be warmed in the fingers a little to make it soft, and should then be moulded to the shape of a truncated cone; and, after being applied to the external auditory canal, the base should be flattened over the adjacent folds of the cartilage of the ear.—*Army and Navy Gazette.*

FAULT IN THE NEW BRITISH 12-INCH GUN.—It is certainly disappointing to learn that the new Mark XI naval gun of 12-inch caliber has not been so successful in later tests as in those previously reported as satisfactory; but it is likewise reassuring to find that the weakness which has been discovered can be surmounted. This weakness lies in the muzzle length of the gun, which was not wound with wire as in earlier patterns, but simply built up with an A and B tube. This new method of construction would appear to be a compromise between the old navy system and the new. Originally, built-up guns were the rule in the navy, but subsequently all the heavier guns were what are called "wire" guns, owing to the inner tubes having wire wound around their exteriors for supports, instead of the old-pattern "jacket." In the earlier pattern of wire-wound gun the winding extended for the whole length, but it is now reported that in the Mark XI guns the wire was not continued to the muzzle part of the guns, and it is here that the weakness has been found, with the result that the outer-tube has had

to be "turned off," and wire will be used as in previous models. No less than twelve guns were made by Woolwich and private firms before this fault of design was discovered, and the price of the guns will be considerably increased by the improvements now required. The navy has hitherto been served very well by its wire guns, the only temporary trouble occurring a few years back in naval ordnance with the Mark VIII 12-inch weapons, which developed muzzle-drop, for which disease, however, Woolwich eventually found a cure.—*United Service Gazette.*

THE BRITISH 12-INCH 50-CALIBER GUN.—It is no secret that the Mark XI 12-inch 50-caliber gun has not proved very satisfactory on trial, and many regrets have been expressed that the very satisfactory Mark X of 45 caliber was superseded for the "St Vincent" class. The Mark X was an all-wire gun, but in the later model the wiring was not continued over the chase end of the barrel, and on proof this portion of the gun exhibited signs of weakness. Modifications are now being made to all these weapons and the wiring is to be continued to the muzzle.—*The Engineer.*

SOWING AND DESTROYING MINES.—The abolition of all mines and mining gear hitherto carried by our seagoing ships of the larger type is being once more strongly advocated by that school of thought, who are all for keeping down weight in stores and fittings on board our fighting ships, so that more coal, ammunition or armor can be carried, on the same displacement as at present. Such a measure would probably be warmly welcomed by the officers and men of the fleet, for in the past the laying of a mine field, and the subsequent raising of the mines, in all weathers, has been a very trying exercise each quarter, and sometimes oftener, where fleets were on the cruise and general evolutions and exercises were being carried out. The wear and tear of the cables, mines and general stores at these exercises were also enormous, and mining evolutions often repeated, sometimes rendered the gear so inefficient that had they been subsequently required for actual war purposes they would have been quite unfit and absolutely untrustworthy for their functions. The idea of making mining a specialty, and fitting out large vessels such as the *Thetis* for minelayers, was an excellent one, which should make it unnecessary for the battleships and cruisers to carry mines or cables; while a mine field will be "sown" by these minelayers in one-fifth of the time it used to take a fleet to do the work. The introduction of steam trawlers, fitted with special trawls for destroying mine fields, will also save scores of valuable lives and several useful fighting vessels—such as were lost by the Japanese at Port Arthur and Dalny during the late war in the Far East, when mine fields were attached by valuable fighting vessels.—*United Service Gazette.*

TRAWLING FOR MINES.—A committee of three officers has been appointed to elaborate the scheme of trawling for mines, which, after lying dormant for three or four years, has now been adopted in earnest by the Admiralty. The intention of the Admiralty at present is to purchase eight steam trawlers, adapt them for the special work, and station two each at Rosyth, Sheerness, Portsmouth and Devonport. In addition, a large number of craft will be subsidized and provided with the principal fittings required, while their crews will be given a small retainer.—*United States Magazine.*

USING BATTLESHIPS FOR TARGETS.—The rapid evolution in guns, armor and projectiles in the navy, renders it necessary for experiments to be constantly carried out, representing as nearly as possible the actualities of war, so that knowledge and experience may be gained to guide those responsible for the ever-changing and progressive designs of our torpedo-craft and super-*Dreadnoughts.* A few months back a portion of the Channel fleet, under the command of Lord Charles Beresford, battered the old battleship *Hero* to such purpose, by salvoes of shot and shell, that she was

sunk at her moorings in shallow water so effectually that it has been impossible to raise her and ascertain the full amount of damage inflicted upon her by modern markmanship and new ammunition. Sufficient data was gleaned, however, by officers on the spot, before the ship disappeared, to prove that the exposed communications in a battleship would soon suffer so much in action by a well-directed fire from the enemy, that the old fire-control arrangements would be useless. On this experience great changes have been introduced and a far more efficient system of control set up. But tests in other directions are now required, and the old battleship *Edinburgh*, which has been on the sale list for some time, is to be temporarily withdrawn and fitted up as a target for the fleet to fire at—guided by a fixed program—so that the knowledge required may, if possible, be obtained by this means. If she survives this ordeal the ship will then be replaced on the sale list.—*United Service Gazette.*

The experimental 21-inch hot-air torpedo has been lost during practice at Portland, and all efforts to find it have so far proved unsuccessful, though two long-lost 14-inch torpedoes were recovered during the process. The cost of torpedoes lost during practice has been very high in the last three or four years, and special returns have now to be made to the Admiralty detailing the circumstances under which these misfortunes have occurred. For 1908 the value of the torpedoes lost during practice exceeded £5000.—*The Engineer.*

MARINE TURBINES AND GAS ENGINES. LIQUID FUEL. SPEED TRIALS.

MARINE STEAM TURBINES.—There is a widespread idea that the turbine can be efficiently applied to a very wide range of merchant work. Actually this is not so, and its superiority for anything but a very limited class of work has yet to be proved.

This is, of course, quite contrary to the popularly accepted idea, so that it will be necessary to justify this statement. In order to systematize the discussion let us recapitulate some of the advantages claimed for the turbine system when applied to merchant vessels. They are principally: (1) Increase in economy; (2) saving in weight; (3) saving in space; (4) saving in oil and attendance; (5) absence of vibration.

Considering (1) economy, it will be readily recognized that this is a point of vital importance in the merchant service, and it is doubtful whether any other consideration can properly compensate for any deficiency in this direction. That the turbine itself is generally superior to the piston engine as regards economy is universally conceded. On the other hand, what concerns the shipowner is not the efficiency of the turbine alone, but the combined efficiency of turbine and propeller. Thus the important consideration to the shipowner is not the consumption of steam per hour per shaft horse-power developed by the turbine, but the consumption per effective horse-power. The effective horse-power is that portion of the total horse-power which is usefully employed in propelling the ship and which corresponds with the actual propeller thrust. Leaving out the question of propeller efficiency for the moment, let us consider a few figures relating to steam consumption per shaft horse-power per hour. The results of numerous trials of turbine-driven vessels indicate that this consumption varies very little from 14 pounds to 15 pounds for all purposes. These figures apply to all classes of marine steam turbines with the exception of those fitted to torpedo-craft, in which it is rather higher. With the piston engine, on the other hand, the steam consumption per shaft horse-power varies very widely with the type of vessel. Assuming the mechanical efficiency of the engine to be from 93 to 95 per cent, the figure for high-speed cross-channel steamers would be from 18.5 pounds to 20.5

pounds. In high-speed ocean liners it would be about 15.25 pounds to 16.5 pounds, and for the slower-speed liners of, say, less than 22 knots, the figure for their highly efficient piston engines would be from 14.75 pounds to 15.75 pounds, while in the ordinary cargo tramp it amounts to from 15 pounds to 15.75 pounds. As regards the reciprocating engines of naval vessels, the corresponding consumption for battleships and the heavier classes of cruisers would be from 19 pounds to 20 pounds, and about 21 pounds to 22 pounds for the lighter cruisers, scouts and torpedo-craft. Thus it would appear that the turbine considered alone is decidedly superior in economy to the reciprocating engines of naval vessels and high-speed cross-channel steamers; the advantage is only slight in the case of racing liners, while there is little to choose between the two types when applied to the slower speed "intermediate" liners.

Now, the only published comparisons between the two systems relate to third-class cruisers and cross-channel steamers, and show a remarkable saving in favor of the turbine. On the other hand—as the above figures indicate—the piston engines fitted to third-class cruisers are extremely uneconomical, and the same remark applies to those in high-speed cross-channel steamers, so that the vessels compared are of the types most unfavorable to the reciprocating engine. It would seem, then, that any general deductions from the results of such comparative trials are very misleading and manifestly unfair to the older system. Thus it must be conceded that the results of a comparison between turbines with a consumption of steam per shaft horse-power per hour of 14.5 pounds, and the reciprocating engines of third-class cruisers, with a consumption of 21 pounds, cannot be expected to apply in the case of, say, an ocean liner of the intermediate type, in which case the consumption with turbines may be 14.25 pounds, and that of corresponding piston engines 15 pounds.

Now, let us go a step further, and take propeller efficiency into our calculations. It is obvious that the comparison of steam consumptions per shaft horse-power is of little practical value, as it takes no account whatever of propeller efficiency. What is required to make a true estimate of the relative economy of the two system is the steam consumption per effective horse-power per hour for every type of vessel. A better word, perhaps, for effective horse-power would be thrust horse-power, as it is the horse-power corresponding with the actual propeller thrust. Thus it would seem that a more rational method of comparing marine steam turbine performance would be by means of the actual thrust produced rather than by the shaft horse-power, as the latter figure only represents an intermediate stage in the transformation. Thus it is of little assistance to know that a set of turbines is developing 20,000 shaft horse-power while we are absolutely in the dark as to whether the thrust horse-power—that portion usefully employed in propelling the ship—is 8000 or 10,000.

There can be no doubt whatever that the high-speed propellers with fine pitch ratios that are required for turbine-driven vessels are much less efficient than the slower running screws used with piston engines. In every instance it has been found that the shaft horse-power as measured by the torsionmeter is considerably in excess of the indicated horse-power necessary to produce the same speed with reciprocating engines. Thus the writer remembers the case of a turbine-driven vessel which was expected to attain the required speed with 6500 horse-power, this figure being estimated from the performance of similar vessels fitted with piston engines. The actual speed obtained fell somewhat short of that anticipated, and a torsionmeter was then fitted. The shaft horse-power, as measured by the torsionmeter, was found to be 8500 instead of the 6500 expected.

Again, whereas the shaft horse-power of the *Tribal* class of 33-knot destroyers was estimated from reciprocating-engined vessels to be 15,000 the actual shaft horse-power necessary was over 20,000. In the 26-knot Coastal torpedo-boats the horse-power is nominally 4000, while actually

over 5000 is required. In the absence of any apparatus for measuring actual propeller thrust it is by such comparisons, or by calculating the effective horse-power required from the results of tank experiments, that we are able to estimate the efficiency of turbine-driven propellers. The figures for propeller efficiency obtained from the trials of model propellers working in undisturbed water are almost valueless when applied to actual practice.

In the case of the *Mauretania*, although the propellers were very carefully designed, and are the result of long and elaborate experiments and comparisons, it is doubtful if their efficiency is over 52 per cent. The efficiency of the *Lusitania's* propellers has been given as 48 per cent, and it must be remembered that these screws are working under conditions very favorable to the turbine propeller.

The efficiency of the propellers fitted to turbine cross-channel steamers may vary from 48 to 52 per cent, while those of turbine-driven torpedo-boats and destroyers cannot be much more than from 45 to 48 per cent efficiency.

Let us compare these figures with the efficiencies obtained with the slower running screws of reciprocating-engined vessels. Here the efficiency may be said to vary from 60 to 66 per cent in most cases, only dropping much below 60 per cent in the case of bluff-sterned single-screw cargo tramps, in which case it may be as low as 55 per cent. With the assistance of these figures we can estimate approximately the steam consumption per thrust horse-power per hour, and so obtain a truer comparison as regards the economy of the two systems.

Naval or merchant vessels.	Type of vessel.	Turbines or reciprocating engines.	Steam consumption per shaft horse-power per hour.	Propeller efficiency.	Steam consumption per thrust horse-power per hour.
			Lb.	Per cent.	Lb.
Naval vessels	Battleships and large cruisers.	Turbines	14.5	50	29
		Reciprocating engines.	19.5	60	32.5
	Small cruisers and scouts.	Turbines	14.5	50	29
		Reciprocating engines.	21	60	35
	Torpedo craft	Turbines	16	47	34
		Reciprocating engines.	21.5	60	36
Merchant vessels	High-speed cross-channel steamers.	Turbines	14.5	50	29
		Reciprocating engines.	19.5	60	32.5
	High-speed ocean liners.	Turbines	14	52	27
		Reciprocating engines.	15.875	64	24.8
	Intermediate ocean liners.	Turbines	14.25	52	27.5
		Reciprocating engines.	15.25	65	23.5

The above table is rather instructive as indicating the limit which the high-speed propeller sets to the efficient application of the turbine system. Of course, the figures in the table are necessarily approximate, but they represent fair averages, and it must be conceded that considerable modifications would be necessary to affect the general conclusions.

As regards the machinery of naval vessels the table shows a marked superiority for the turbine system with reference to economy. Thus the increase in steam consumption with reciprocating engines would appear to be about 14 per cent with battleships and the heavier classes of cruisers, and as much as 20 per cent with the lighter and less efficient engines of small cruisers and scouts; while as regards torpedo-craft the turbine system is only slightly more economical. In other respects also the steam turbine is admirably suited to the requirements of naval work.

It requires very little attention and no great skill in operating, qualities which may be of great importance in action, and also in view of the frequent changes in the engine-room staff. Full power can be easily maintained with the turbine, whereas in the piston engines fitted to the later classes of warships the bearing surfaces were generally deficient, and very careful attention on the part of a numerous staff was necessary at anything approaching full speed, while very gradual working up was essential. Another quality of the turbine which is of great importance in naval work is its suitability for working at any proportion of full power. On the other hand, the piston engine shows to best advantage when worked at one unvarying speed. When all these considerations are taken in conjunction with the advantage of lying very low in the ship, the overwhelming superiority of the turbine system for this class of work cannot be questioned. With regard to merchant vessels, however, the situation would appear to be very different. The table shows the turbine system to considerable advantage when applied to high-speed cross-channel steamers, and actual practice supports this conclusion. In this case the table indicates an increase of 12 per cent in the steam consumption when piston engines are adopted.

On the other hand, when we consider the case of high-speed racing liners, it would seem that the consumption of steam per thrust horse-power is about 9 per cent greater when turbines are fitted, so that the advisability of applying turbines to this class of vessel appears somewhat doubtful. Again, in comparison with the highly efficient reciprocating engines of the intermediate type of ocean liner, the turbine system appears distinctly inferior in economy, as the increase in steam consumption when turbines are adopted appears to be about 17 per cent.

There seems to be considerable reason to believe that this conclusion is supported by the actual results obtained with turbine vessels of this class. Thus there exists little doubt in the minds of many engineers that better results with reduced expenses would have resulted had piston engines been fitted in the express Cunarders. Again, a significant silence is maintained regarding the performance of the slower-speed turbine liners, and there are persistent reports of excessive coal consumption. In this connection a comparison of the coal consumption of the *Carmania* with that of her reciprocating-engined sister *Caronia* would be very interesting, and possibly instructive. Apart from the question of economy, the turbine is not seen in so favorable a light when compared with the piston engines of the ocean liner.

With ample bearing surfaces no great difficulty is experienced in maintaining full speed with this type of engine. Again, the speed remains practically unaltered when at sea—a condition which shows the reciprocating engine at its best. On the other hand, the turbine is a very much simpler machine. The wearing parts are very few and the wear scarcely perceptible. The lubrication is automatic, so that a considerable saving in attention and oil must result. Then, as the wearing parts are few, the depreciation with the turbine should be very slight. The point to be considered is whether these advantages can compensate for an increase of from 9 to 17 per cent on the coal bill.

In the early days of the turbine a great deal was said and written about the saving in weight and space consequent on its adoption. Actually there is a valuable saving in weight in the case of high-speed cross-channel steamers, and generally also with naval vessels, though not to the same extent. In torpedo-craft there is little to choose between the systems in this respect. The weight of the turbine machinery of the *Mauretania* and *Lusitania* is practically the same as that of corresponding piston engines, and this has generally been the case whenever turbines have been applied to the heavier classes of vessels in the merchant service. The reason of this is that in such vessels, in order to keep the number of revolutions per minute low and so assist the propeller efficiency, it is necessary to make

the turbines as large as circumstances will permit. Thus it may be said that, in all cases except high-speed cross-channel steamers and naval vessels, the weight is generally about the same; but on the other hand the space required is generally greater when turbines are adopted. This increase in space may amount to as much as 25 per cent.

As far as absence of vibration is concerned, there is not a great deal to choose between the systems when applied to merchant vessels, as a well-balanced four-crank engine will run with very little vibration. Although, generally, turbine-driven vessels are slightly superior in this respect, there are a fair number in service in which vibration is rather severe. Thus in the express Cunarders there is or was considerable vibration in the vicinity of the wing propellers, and there are several cross-channel steamers in which in certain parts of the ship it is distinctly unpleasant.

This vibration in turbine vessels is almost entirely due to the propellers. Even the most careful balancing cannot remove it, because, when the propellers are arranged to run close up to the ship's side, as each blade passes through the faster moving wake close to the ship's skin the center of effort of the propeller is moved. Thus a succession of shocks is produced. The use of specially shaped propeller blades may reduce the evil, but the most effectual way is to arrange the propellers at a good distance from the skin of the ship. This involves a loss of efficiency, as, by placing the propellers in the fast-running wake against the ship's side some of the work which has been expended in putting the wake into motion is regained in the form of additional thrust. Freedom from breakdown is another point with regard to which the two systems may be compared. The reciprocating engines fitted to mail and intermediate liners are very free from breakdown, and one would suppose that the same might be said of a well-designed and constructed turbine. However, quite a large number of turbine vessels have suffered from blading strips or had their dummies carried away. Of course, such happenings are not advertised, but a complete list of such mishaps would surprise the outsider. Thus faulty brazing was the cause of an extensive strip in one notable case, whilst an unmechanical method of rotor construction produced the same result in another; a too flexible design of rotor wheel caused the dummies to be carried away in other cases; and in another an almost complete strip was caused by opening the regulator too suddenly.

The list could be extended to a greater length, but it must be admitted that the majority of these mishaps occurred from inexperience both in design and operation. On the other hand, it is somewhat discouraging to hear that the turbines of one of our recent second-class cruisers stripped their blading when being tried under steam in the works, in spite of the fact that the latest type of segmental blading was adopted. However, there can be little doubt that in time, as more experience is gained, such turbine troubles will become very rare.

It is difficult to conceive of any breakdown to a reciprocating engine which cannot be overcome at sea. But a serious strip in a turbine would take a very long time to repair, and it is very doubtful if re-blading could be carried out at sea at all. On the other hand, it is scarcely likely that all the shafts would be put out of action at the same time.

Again, it is possible to subject a piston engine to a complete examination at the terminal ports, and such an examination must do much to secure immunity from accident. With the heavier class of turbine machinery this is not possible, as the opening out necessary for a complete examination would entail a great deal of time and labor. It must be admitted, however, that in the reciprocating engine there is a vast number of bearings and wearing parts which are constantly requiring adjustment or renewal. The wear and tear with the turbine is practically nil, and the work of the shore gang must be greatly reduced by its adoption. Again, if we could rely on the blading and dummies remaining intact it would only be necessary to open up the turbines at long intervals. On the other

hand, it ought not to be forgotten that very expensive overhauls and renewals have been necessary with several turbine vessels.

To sum up our comparisons, it is evident that the turbine system is decidedly superior for all classes of naval vessels, and also for high-speed cross-channel steamers.

With regard to high-speed ocean liners, the increase in steam consumption per effective horse-power is about 9 per cent with turbines. On the other hand, the turbine is much simpler to operate and adjust, and when well designed and constructed should run with very little fear of breakdown. A considerable saving in oil and attendance results from its use, and in all probability it will last much longer. These advantages must be set against the increase in the coal bill. Now, such an increase on the coal bill of a racing liner is naturally a very serious matter, and it is very doubtful whether any of the above advantages can compensate for it.

It would seem, then, that on the whole, the balance is in favor of the reciprocating engine even for mail steamers of the highest speeds. However, a slight increase in the efficiency of the turbine-driven propeller might suffice to turn the scale in favor of the turbine system. It must be remembered that improvements in reliability and efficiency are in the future, and it is the present we are concerned with. When we consider the case of ocean liners of rather slower speed, it is very evident that the turbine cannot be expected successfully to compete with the highly efficient combination of reciprocating engine and propeller fitted to this type of vessel. So that it seems probable that the piston engine will continue to hold its own for some time to come, as far as this class of work is concerned, although something may be done with the combination of the two systems.

A good deal has been written lately regarding the application of the turbine to slow-speed cargo tramps. A little reflection will show that it is out of the question to apply the turbines to the propeller shafting without the use of some form of intermediate gearing.

In the first place, in order to have the revolutions per minute such that the weight of machinery would remain unaltered, it would be necessary to adopt propellers with a pitch ratio of about .55. Now, the pitch ratio of most turbine-driven propellers is in the neighborhood of unity, and although they work behind fine-lined ships, their efficiency is decidedly low. What, then, can be expected from propellers with a pitch ratio of .55 working behind the bluff stern of a cargo tramp with a 20 per cent wake? Something might be done by the adoption of some form of gearing, but the problem is capable of no easy solution. It is rather difficult to understand this anxiety to discard the well-tried piston engine for the steam turbine in this class of vessel, for the advantages to be gained by so doing are not at all evident. The reciprocating engines fitted to the ordinary cargo tramp are very economical in themselves, and are combined with the propellers which are best suited to this class of work. They are thoroughly understood and require and generally receive very little attention when under way. On the other hand, it is impossible to obtain a reasonable efficiency from the fine pitch ratio screws associated with the turbine system when working behind such vessels, to name only one difficulty.

From the whole of the foregoing remarks and comparisons it is obvious that the propeller is the weak point in the turbine system, and that with the efficiencies obtained up to the present the turbine can only compete successfully with the least efficient class of reciprocating marine engines. No doubt some improvement in this direction may be expected as a more accurate knowledge of the performance of turbine-driven propellers is obtained. An important step in this direction would be the adoption of a practical form of thrust meter, and the direct measurement of thrust horse-power. However, at the best the improvement to be expected cannot be of great amount. Thus it would appear that the extent of the successful application of the marine steam turbine in its present form to merchant vessels is likely to remain considerably restricted.—*The Engineer.*

ABSTRACT OF "SOME CONSIDERATIONS ON THE APPLICATION OF INTERNAL COMBUSTION ENGINES FOR MARINE PROPULSION." (Paper by Mr. H. C. Anstey, read before the Institute of Naval Architects.)—The principal advantages claimed for the internal combustion engine are economy in fuel, weight and space. Some very remarkable results have been obtained with small petrol engines in respect to power developed on a given weight, but it is to be remembered that this extreme lightness is due principally to two causes, viz.: (1) A high speed of revolution, and (2) the use of special materials of construction. No part of the extreme lightness is due directly to the engine being of the explosive type. There are certain conditions incidental to the internal combustion engine which make higher speeds of revolution possible than are possible or advisable with a reciprocating steam engine of similar size. To arrive at a proper sense of proportion on the question of weight and space, it is desirable to examine it on broad mechanical principles. Of the factors which together make up the horse-power of an engine, the only one which in an engine of given power may be altered without affecting its weight is the number of revolutions, subject always to the consideration that the inertia forces due to the speed are not such as to require special strength and weight of parts and foundations.

From the factors in the formula for horse-power, it follows that if we assume piston area, stroke and number of revolutions to be constant, the power is proportional to the mean pressure. The weight of the engine is, however, proportional to the maximum pressure for which the engine has to be designed, and the horse-power per ton is, therefore, proportional to the ratio, mean to maximum. In considering what this ratio is in a marine steam engine we are faced with the difficulty that the power is divided between several cylinders, each having a different ratio of maximum to mean, but for purposes of comparison we shall probably not be far wrong if we assume that the whole of the expansion is carried out in the low-pressure cylinder which develops the whole power and is credited with the whole of the weight. Under this assumption the maximum pressure will be, say, 250 pounds, and the mean 50 pounds, giving a ratio of maximum to mean of 5. This ratio will vary with the ratio of expansion, and will be generally higher in the merchant service than in naval practice. In internal combustion engines, in spite of variety of type, there is not very great variation in this ratio. In the engine with which the author is best acquainted it is approximately 4. In petrol engines it will be rather less, and in engines using a high compression it will be somewhat more. Taking the ratio as 4, it must be corrected for the cycle employed, and as the internal combustion engine has in most types only one working stroke in four, the ratio must be multiplied by four, and the comparative figures will then be, for the steam engine 5, for the internal combustion engine 16; that is to say, considered from the point of view of pressure alone, the horse-power per ton in an internal combustion engine will be 1/3.2 times that of a steam engine of the same dimensions.

There are, however, certain factors to be considered which will make the comparison more favorable to the internal combustion engine. First, the items of weight in a steam engine which are directly proportional to the horse-power account for a fair proportion of the total weight, but in the internal combustion engine the proportion of similar parts will be very much less.

Taking the three factors, lighter accessories, lighter parts and higher possible speeds of revolution into consideration, it would appear that the figure 1/3.2, which was arrived at from considerations of maximum and mean pressures alone, can be considerably increased. How much it may be increased is more or less a matter of conjecture, but it will possibly be of the order of 1/1.5 to 1/2.5, so that for engines of the same linear dimensions the horse-power per ton will in the internal combustion engine only be about one-half what it will be in a steam engine.

So far we have left out of account the question of weight of boilers and their accessories. These will have a counterpart in the gas producers for the gas engine, but have no equivalent in the oil engine. So far as the gas engine is concerned, the weight and space required for producers is largely dependent upon the type of fuel used and the cleaning arrangements necessary to deal with the gas, and this is too large a subject for the present paper. As the weight of boilers is usually about equal to the weight of engines, it follows from the above conclusion that the horse-power per ton will, for the complete installation, be about equal to that of an oil engine of the same linear dimensions as the steam engine. It is possible that there may be some saving, but it appears certain that if the internal combustion engine is to develop on lines parallel to that of the steam engine, that is with few cylinders, there will be no very great saving, such as has sometimes been imagined by inference from the results obtained with small-sized units, where the speed of revolution is high.

The permissible speed of revolution can be connected with the diameter of cylinder in the following manner: The reciprocating weights per square inch of piston increase with the diameter, and are approximately proportional thereto, and it can be shown that for a given piston speed the permissible speed of revolution varies inversely as the diameter. It follows, therefore, that a necessary condition of high speed of revolution and higher power per ton of weight is a small diameter of cylinder.

The direction then in which light weight is to be sought lies in keeping down the diameter of the cylinder, thus allowing a higher speed of revolution; but for large powers this involves a large number of cylinders.

That a larger number of cylinders than usual with steam practice is inevitable is apparent from considerations of uniformity of turning moment, but how far the number can be advisedly increased can only be determined by experience. Up to the present sixteen cylinders have been used on one shaft, and there seems no reason why this number should not be increased by successive steps of four or more cylinders at each step. The powers, however, which have been obtained per cylinder in engines whose design admits of application to propulsion are not large, probably not exceeding 100 horse-power, and until the unit is largely increased the very large powers required in many present-day vessels are out of reach of the internal-combustion engine, the immediate application of which would appear to be concerned mainly in the propulsion of boats and small vessels. In powers, say, of 500 horse-power on one shaft, it appears reasonable to expect 12 to 15 horse-power per ton of machinery weight, and though this is low compared with larger-powered engines for naval work, it is higher than the ordinary run of merchant service practice. The figures given above refer to a complete installation of oil engines, without auxiliaries; the weights will be greater with gas engines, for the reasons already given.

In connection with the use of a large number of cylinders, some reference should be made to the proposals which have been made from time to time for transmitting power from engine to propeller electrically.

The problem of electric propulsion is one of great interest, and its adoption in special circumstances may be justified, but it would seem that generally it does not offer sufficient commercial advantages for mercantile work, and on the other hand, for naval work it cannot compete with existing steam machinery in the all-important considerations of weight and space.

The question of the economical application of the internal combustion engine to propulsion in large sizes, whether the economy is viewed from the standpoint of cost, weight or space, is largely bound up with the problem of making a reliable reversing engine. In small sizes, the familiar devices of reversing propeller or reversing clutch will, no doubt, do all that is required, but few, if any, marine engineers would care to contemplate their adoption in thousands or even several hundreds of horse-power.

An account of a successful experiment in a reversing engine of 80 brake horse-power of the Hornsby type has been given by the author in another place. The method there described is applicable to larger engines of this type. With such a reversing engine there is a possibility of considerable saving in space over steam machinery, and as compared with mercantile practice, some appreciable saving in weight without reference to saving in quantity of fuel carried. The main claims, however, which the internal combustion engine has for consideration are in the superior fuel economy and smaller number of men required for working, and these claims are so unquestionable that there appears no reasonable doubt that it must eventually, in a large number of cases, take the place of steam machinery at sea, as it is now doing on land.

The author has endeavored to place the question of weight and space required for internal combustion engines in its true perspective, and although the saving, particularly in space, will in most cases be real, he would repeat that, on the whole, there will be no great saving in weight such as has sometimes been imagined by inference from results obtained in small units.—*The Engineer.*

TURBINES OR GAS ENGINES.—The question "Turbines or motors in ships?" is discussed at considerable length in the current issue of the *Journal of the Royal United Service Institution*, and the whole being a translation from *Nauticus*, it is very interesting to examine sundry questions of first importance to shipbuilding through the medium of continental spectacles. In his conclusions the writer states that for large ships, neither advantages as regards economy nor any considerable saving in weight and space are to be expected from internal-combustion engines. The reduction in the amount of fuel necessary to be carried, and the consequent decrease in the size of the bunkers, constitutes the only advantage as regards weight and space. Other military or technical qualities peculiar to internal-combustion engines, which will lead to their further development, have yet to be discovered. An undoubted advantage is the absence of smoke, which makes it possible to approach the enemy without being observed. This can, however, be practically equally well attained with a steam engine installation by using oil fuel. Oil motors are always ready, and can be started in a few minutes. Suction-gas motors do not possess this merit. The waste in the gas-generators when the motors are stopped is rather great. It takes longer to get the gas-generator going than it does to raise steam in boilers, especially small-tube boilers.

Internal-combustion engines do not strain the engine-room *personnel* as much as steam engines; there is no longer the boiler installation, which, especially at forced draught, throws such a great strain on the stokers, to be attended to. This, again, mainly applies to oil motors, which automatically develop their highest power without making any special demands on the *personnel*. In the case of suction-gas installations, the attendance required by the gas-generator cannot be much less than that required by steam boilers, especially with large installations, if the fuel receptacle of the gas-generator is limited in size in order to effect a saving in weight. The statement made in all commendations of the suction-gas motor as a marine engine, that the gas-generator only needs to be filled with fuel once a day, of course, only applies to shore or small marine installations. Another frequently commended advantage of internal-combustion engines is the absence of a system of steam-pipes. In the case of the suction-gas installation, however, there is the much more dangerous gas-pipe system to take its place. Whether leakage from an oil pipe is less probable, and its injury in action less dangerous, may be regarded as doubtful. If, therefore, we sum up the foregoing, the advantage possessed by all internal-combustion engines is the absence of smoke; in addition, oil motors have the advantage of constant readiness and immunity from trouble in working.

These few advantages have a number of disadvantages to counter-

balance them. Difficulties as regards starting, reversing and large alterations in the number of revolutions, are common to all internal-combustion engines. In this respect the steam turbine is much more satisfactory. It can be started like a reciprocating engine; its number of revolutions can be altered within wide limits by throttling the steam or connecting and disconnecting pressure stages; finally, the propeller shaft can, comparatively simply, be rendered reversible by the installation of an astern-turbine. From this point of view the introduction of the internal-combustion engine would appear to be a retrograde step. The real retrogression would, however, be the fact that a piston-engine with crank-drive, whose numerous transmitting and distributing parts need more attention and repair than the steam engine, was being developed to take the place of the rotating engine, the steam turbine.

The introduction of the steam turbine for shore and marine use, in conjunction with the development in the employment of electric power, has opened up a great future for rotating engines. There must be very great merits in internal-combustion engines, if engines with crank-drive are again to come into favor. That even great economy is not sufficient to ensure this is well shown by the fact that the highly developed and very economical superheated steam engine cannot compete—at least for high powers—with the steam turbine, and that, with few exceptions, its adherents have not, up to the present, succeeded in getting it utilized for the propulsion of ships. If any internal-combustion engine could have a chance of being generally adopted for the propulsion of ships, it would be the gas-turbine. This is, however, at present in a purely experimental stage of development, and the results so far obtained, thermal or mechanical, do not warrant the hope that, even for land installations only, a practical gas-turbine can be produced in the near future.

The internal-combustion engine, in its present form, and where the conditions are specially suited to it, will, of course, maintain its position, and will find many new fields of employment. Thus, it will probably not only remain the most suitable means of propulsion for ships' boats, small torpedo-boats, submarines and small yachts, but will be more extensively made use of as an auxiliary engine for sailing ships, and for the propulsion of small and moderate-sized, including seagoing cargo vessels. In these directions much may be expected from the Diesel motor in particular, especially if its starting and reversing arrangements are improved, so that it can be used with direct propeller-drive in moderate-sized vessels.—*Page's Weekly.*

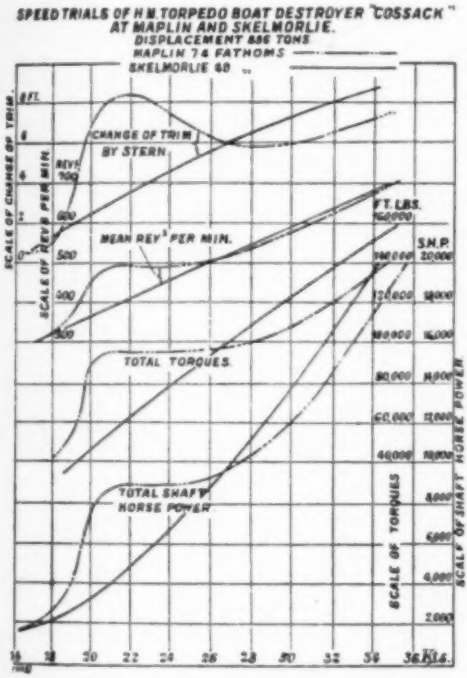
SPEED TRIALS OF THE DESTROYER "COSSACK." By Sir Philip Watts. (Paper read before the Institution of Naval Architects, April 2, 1909.)—In the discussion which followed the reading of Mr. J. E. Thornycroft's paper last year I stated that the Admiralty were taking steps to obtain by a series of comparative trials additional data concerning the effect of shallow water upon the speeds of ships.

The trials have been carried out, so far as the exigencies of the service have permitted, and, although they are far from being as full as could be desired, they will probably be regarded as of sufficient interest to be placed on record in the transactions of this institution.

A full series of measured-mile runs was made with the *Cossack* at speeds varying from 17 knots to 34.5 knots, first on the Maplin Sands, and afterwards at Skelmorlie (depth, 7.4 fathoms at the Maplins and 40 fathoms at Skelmorlie). They were made under as fair conditions as can ordinarily be secured without undue expenditure of time and money in waiting for specially favorable weather. The conditions were practically the same as on the official trials of this type of ship, except that there were no restrictions as to the consumption of fuel. The *Cossack* was chosen for the purpose as she had recently been delivered, and her propeller shafts had been calibrated for torsion stresses.

Each shaft had Bevis-Gibson flashlight torsionmeters of the axial type, supplied, and erected in place by Messrs. Cammell, Laird & Co. It was found possible to get a length of shaft 20 feet between the two discs of the apparatus, so that the readings on the scale at the eye-piece were fairly open and reliable; and as the torsionmeters, when once fitted, were not disturbed till the experiments were completed, any slight fluctuation of torque with revolution does not vitiate the comparison of the results obtained on the different trials.

Revolution counters, worked from each shaft, were fitted on the upper deck, and a 20-foot water level was erected in the middle line plane of the ship, to enable the change of trim to be accurately measured. The vessel was kept as nearly as possible at the same trim and displacement throughout the trials.



The speeds over the mile were carefully taken by independent observers. The wave profiles were obtained by measuring down from the gunwale at various positions along the ship. In the case of the stern wave the height and distance of the crest astern were accurately measured and the profile in other respects was sketched by an observer.

The depth of the water in which the runs were made on the Maplins was taken at fairly regular intervals throughout the trials, the course having been previously carefully sounded from end to end, and found to be very uniform in depth.

The data obtained, after correction for any slight variation in displacement, etc., are shown in the figure annexed. It will be seen that the general characteristics of the curves closely correspond to those obtained by Messrs. Yarrow, Herr Popper, Major Rota, Captain Rasmussen and Messrs. Denny. With her maximum powers the *Cossack* is able to develop

in shallow water a speed of about 1.4 knots in excess of that which she would develop in deep water at the same displacement and with the same shaft horse-power.

It is probable that the water at Skelmorlie is sufficiently deep to eliminate the effect of the bottom in these experiments. The results given by Major Rota show that a depth of 34 fathoms should be sufficient for this vessel's purpose. This is also confirmed by the experiments with a German torpedo-boat in 1904, which showed that at a depth of 40 meters the resistance differed but slightly from that at a depth of 60 meters.

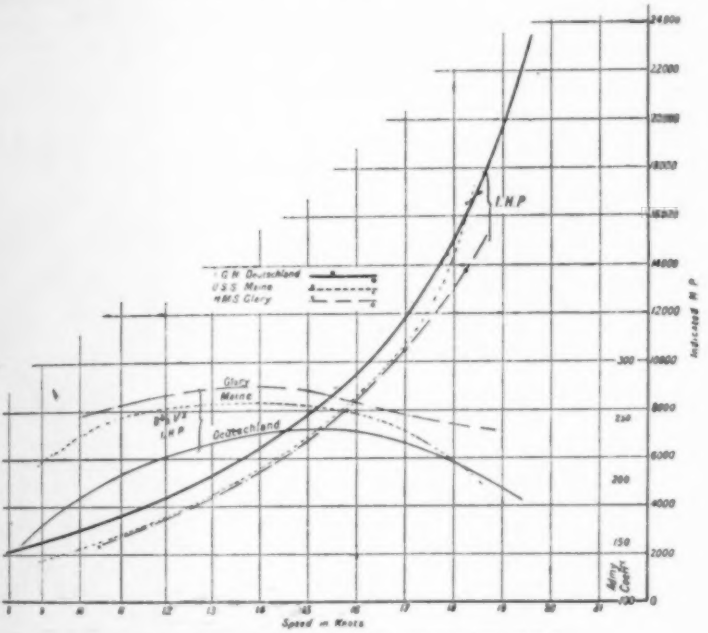
The results obtained for the *Cossack* may be used for other vessels of approximately the same size and form, but they do not apply directly to vessels differing materially in size and form.—*Engineering*.

SPEED TRIALS OF THE "DEUTSCHLAND" CLASS.—Whatever may be the merits or the demerits of the new battleships of the *Nassau* type, it is certain that the first vessel of this type is still some way from completion, and the two most powerful classes of capital ship now possessed by the German government are the *Deutschland* and *Braunschweig* series, each composed of five vessels of 13,200 tons. In point of launching date they are contemporary with the *Swiftsures* and the *King Edwards* in the Royal Navy, and fall between these two classes in size. In this they are more comparable with the *Glory* class, but an even more striking resemblance is found between the *Deutschlands* and the United States battleships of the *Missouri* type, which were slightly earlier in point of date, but are of almost identical dimensions. The following table gives the principal features of the three types:

	Glory.	*Missouri*.	*Braunschweig-Deutschland*.
Date of launch....	1898-1899	1901	1902-1906
Nationality.....	British	United States	German
Length p.p.....	390 ft.	388 ft.	398 ft. 6 in.
Beam	74 ft.	72 ft. 3 in.	72 ft. 10 in.
Draft	26 ft.	25 ft. 6 in.	25 ft.
Displacement	12,950 tons	12,440 tons	13,200 tons
Block coefficient .	.602	.608	.633
Speed.....	18.25 knots	18.25 knots	18.5-19 knots
I.H.P.	13,750	16,500	17,000-19,700
Armament.....	4 12-in., 35 cal.	4 12-in., 40 cal.	4 11-in., 40 cal.
"	12 6-in.	16 6-in.	14 6.7-in.
"	12 3-in.	6 3-in.	12 3.4-in.
Armour: Belt....	6-in.	11-in.	9½-in.
" Turrets.	12-in.	12-in.	10-in.

Some interest attaches to the machinery designs of the German vessels. The first five, namely, the *Braunschweig, Elsass, Hessen, Preussen* and *Lothringen*, are fitted with a combined system of boilers, which includes six cylindrical and eight Schulz-Thornycroft—an adaptation from British practice that emphasizes Lord Brassey's remark. The *Deutschland*, with her sister ships *Hannover, Pommern, Schlesien* and *Schleswig-Holstein*, have only the Schulz-Thornycroft boiler. Both classes are fitted with triple screws driven by three-cylinder triple-expansion engines. As is usual in the German Navy, the designed revolutions—110 for full power—are on the low side, and while the long stroke and relatively slow speed may induce economy, it is certainly at the expense of weight and space occupied, and the engine rooms of this class are very cramped. To a very large extent the *Nassau* has been developed from the *Deutschland*, and her engine-room arrangement, with three sets of 7000 indicated horse-power engines, is very poor. The economy of the *Deutschland* class on the whole is good; at 17 knots they require just 9 tons per hour; at 18½ knots the consumption is 13.6 tons, while at a cruising speed of 11 knots

only 2½ tons an hour are required. It is worth while noting that all German ships—indeed, nearly all foreign ships—are fitted with feed heaters, an item practically never included in British war vessels, but certainly worth adopting for the sake of the additional economy. Triple screws never met with great favor in this country prior to the introduction of turbine machinery, where they are practically essential; the Admiralty naval authorities have always considered that, compared with twin screws they involve serious sacrifices in efficiency of propulsion. In the pro-



SPEED TRIALS OF THE DEUTSCHLAND, MAINE, AND GLORY

gressive trial trip curve of the *Deutschland* class, which we are able to publish, this fact is evident, and to show more clearly the extent of the waste involved we have added the speed and power curves of H. M. S. *Glory*, and the U. S. S. *Maine*, of the *Missouri* class. The superiority of the *Glory*—launched some six years previously—is very marked, the horse-power required being about 1000 less at 11½ knots, and 2000 less at 18 knots, indicating an increased expenditure of power on the part of the *Deutschland* of 15 per cent at full power, and 33 per cent at the lower speed. With overall dimensions and displacement so extremely similar, this difference cannot be accounted for only by shape of hull, and it corrobates the contention of the Naval Engineering Department at Whitehall as to the inferior propulsive efficiency of the triple screws. With a designed power of 16,000 indicated horse-power, and a corresponding speed of 18 knots, it is interesting to notice the extent to which the machinery has been forced. The *Hannover*, for instance, ran up to over 22,000 horse-power for a short time, and the *Pommern* exceeded 20,000 for some hours, attaining with this a speed of 19.26 knots. This was achieved with an inch of air pressure and a coal consumption of only 1.61 pound per indicated horse-power per hour.

Experience showed on the lower power trials between 10 and 12 knots, that in terms of coal burnt it was more economical to run the two side screws only and to allow the center screw to revolve idly. The lower portion of the horse-power curve is, therefore, taken through these spots. The Admiralty coefficient curve, of course, also compares unfavorably with that of the *Glory*. The shape of the curve of the U. S. S. *Maine* is typical of many American warships. The peculiarly rapid rise of the horse-power curve at the higher speeds is almost invariably found in the ships of that navy, and is due to the full and straight lower water lines so generally adopted. The *Colorado* and *Rhode Island* classes exhibit just the same tendency. A feature of the performance of the *Deutschland* class of great interest is the uniformity of the results obtained from the several vessels belonging to it, but comparing the three types of the various nations, it is impossible to ignore the greatly superior propulsive results of the English ship.—*The Engineer.*

MISCELLANEOUS.

TYPES OF WARSHIPS OMITTED IN RECENT PROGRAMS OF NAVAL CONSTRUCTION. By Lord Brassey. (Paper read before the Institution of Naval Architects, March 31, 1909, with an abstract of the discussion which followed.)—I have had the honor of being invited to open our proceedings with a short paper on shipbuilding for the navy. At the present time, when public attention is keenly directed to naval affairs, and some anxiety is felt as to our naval position, your council desires that our shipbuilding policy in its technical aspects should be discussed by members of your institution.

It is an obvious remark that it is in vain that Parliament should vote lavishly for the navy if the money is ill-spent. In the latest edition of his work on "Fortification," in words which may appropriately be quoted, Sir George Sydenham Clarke recalls the enormous waste of many ill-designed vessels which have been built for the British Navy. He rightly insists that if the errors of the past are to be avoided in the future, it can only be by "supreme care and unwearying study in directing shipbuilding policy."

In preparing a paper dealing with technical questions of extreme difficulty and complexity, which is to serve as a target to the skilled gunlayers of this institution, the layman is bound to entrench himself behind leading authorities, as well naval as professional. In recent years official pronouncements have been few. We have had no information from committees on designs. The statements and minutes of First Lords give us the considered judgments of their naval advisers. Balanced arguments are not presented. It is wise on the part of those in responsible administrative positions to refrain from giving occasion for doubt or question. Happily for the present purpose, many distinguished naval officers and naval writers, unfettered by the trammels of office, have in recent years stated their opinions in publications of the highest merit.

In considering programs of construction, battleships stand first in order. Those now building for every maritime power are of the *Dreadnought* type.

Unanimity of professional opinion in relation to construction is weighty, though perhaps less conclusive than some may think. In a paper contributed to the last issue of Jane's *Fighting Ships*, Colonel Cuniberti, the eminent Italian constructor, has some interesting observations on the influence of the imitative sense on contemporary shipbuilding for the purposes of war. "The needs," he says, "of every country differ. Their constructors build types almost identically the same . . . . The number of experts scattered about the world who, with pencils in their hands, are designing ships, is small. Some of these, certainly, whilst having one eye on their own design, have the other turned to the drawing-board of their opposite number." Unanimity has been reached, not as the result of independent investigation, but by imitation of British designs.

These remarks are not made in disparagement of the *Dreadnought*. To the British Admiralty belongs the credit of producing the first specimen of a new class of battleship, showing a marked advance over all preceding types in speed and in guns of the heaviest caliber. The coal-endurance is sufficient for ocean passages. Occasions may arise in naval warfare when superiority in speed and big-gun armament might decide the issue. It is necessary to secure a preponderance for the British Navy in *Dreadnoughts*.

It is not inconsistent to contend that other types beside the *Dreadnought* are of great value for the line of battle. We see in recent naval construction a continuous increase in dimensions and in cost.

	Displacement. Tons.	Cost (including guns). £
Lord Nelson.....	16,500	1,654,098
Dreadnought	17,900	1,813,100
Téméraire	18,600	Not given in Navy Estimates.
St. Vincent.....	19,250	In round figures possibly
Neptune	20,000	2,000,000*l.*

The latest battleships designed for Germany, the United States and Japan are ships of 20,000 tons.

In his recent volume on Naval Administration, Captain Mahan insists on the objection to continual increase of dimensions: "When a certain speed has been attained, a small increment must be purchased at a very great sacrifice. What shall the sacrifice be? Gun power? Then your vessel, when she has overtaken her otherwise equal enemy, will be inferior in offensive power. Armor? Then she will be more vulnerable. Something of the coal she would carry? But the expenditure of coal in ever-increasing ratio is a vital factor in your cherished speed. If you can give up none of these things, will you increase the size? . . . . Will you have smaller numbers with larger individual power? Then you sacrifice power of combination."

There are considerations in connection with armaments. "The main instrument," says Sir Cyprian Bridge, "is the gun, and it is its fire that has to be concentrated. If the ships are distributed at suitable intervals, the enemy's return fire must be either divergent or be only imperfectly concentrated. . . . . The mounting of very heavy armaments in single ships reduces numbers. . . . . This constitutes an obstacle to the desirable tactical dispersion." So, too, Sir Reginald Custance. In his chapter on the Battle of Tsushima, the gallant author shows how "the fire of sixty-three guns was concentrated on the leading ships of the Russian line. Shells rained on their decks. They were enveloped in a sheet of flame. The great principle of dispersing the guns to concentrate their fire was emphasized and confirmed."

With increase of dimensions we have not secured invulnerability. It is not possible to protect the whole area of side above water with impenetrable armor. In the war in the Far East the mine was a deadly weapon.

If we were creating a new navy for the defence of the British Empire, it would be desirable to lay down a proportion of ships of moderate dimensions. We are relieved of this necessity. We have, as Mr. McKenna has said, a mighty fleet of ships earlier than the *Dreadnought*. The forthcoming volume of the *Naval Annual* will give a list of forty-four British battleships. Classing the *Lord Nelsons* for the time being as *Dreadnoughts*, we have no less than thirty-eight other ships, of which the oldest was launched in 1894. Collectively, these ships carry one hundred and forty-four 12-inch guns, eight 10-inch guns, thirty-two 9.2-inch guns, twenty-eight 7.5-inch guns and four hundred and twenty-eight 6-inch quick-firers. They are heavily armored. Speed, 18 to 20 knots. With brave and well-trained men behind the guns, and under the command of captains reared in a service which has no record of failure, we have a fleet of vessels which well answer in these later days to the two-deckers of the glorious past.

It is not necessary to dwell on the armored cruisers. The type has disappeared from the latest programs of construction. Equal in dimensions and in cost, with a slight inferiority in armament and armor, but with a steaming power equal to 25 knots at sea, the four ships of the *Invincible* type, and the *Indefatigable*, should certainly be included in the *Dreadnought* class in any comparison of naval strength. Armored cruisers cost as much per ton as battleships. Our appropriations to cruiser construction have not been approached under any other naval administration. In the view of many naval authorities it would have been well to have spent less on armored cruisers and more on battleships.

The large protected cruisers are the least effective of all the ships on the British Navy list. It is a waste of public money to keep such ships as the *Powerful* and *Terrible* in commission. They carry large crews. They are too vulnerable to be reckoned as fighting ships.

It remains to refer briefly to the inshore squadron. The *Dreadnoughts* are essentially ships for the open seas—beyond the range of the torpedo, and free from the danger of the floating mine. In narrow and shallow waters, in the southern part of the North Sea, with all lightships and buoys removed, navigation would be hazardous in the extreme. At night and in thick weather the torpedo would become a most formidable assailant. The gun is a useless weapon against an invisible foe. The naval experience and professional skill which have produced our noble fleets for the open waters should now be directed to the creation of a type specially designed for the inshore squadron.

Admiral C. C. P. Fitzgerald remarked that it had at one time been his misfortune to differ from Lord Brassey on the question of building second-class battleships, but now he was pleased to find himself in agreement with the author's views on one important point raised in the paper. Lord Brassey had pointed out that in recent years official pronouncements on matters of naval architecture had been few. The public had been given no information on designs, nor had the arguments for or against constructional policy been submitted. Nothing but the considered judgments of the naval advisers to the Admiralty had been put forward by the officials. The speaker interpreted the author's somewhat cryptic remarks on this subject to mean that he was in favor of the principle of the naval authorities openly declaring their intentions and inviting discussion by competent men. They had had an excellent illustration of this policy in 1889, when, under the Naval Defence Act, a sum of 21,000,000*l.* was provided for the construction of seventy vessels. Sir William White had then come before them with full permission of the Admiralty, and asked their opinions. What was the result? In those days we had reason to fear the intentions of a power with whom, fortunately, we were now on terms of close friendship. By our straightforward declaration of policy we had maintained our position, and indirectly our action at that time had safeguarded the empire during the critical period of the Boer War. The opposite principle, that of secrecy, was now approved. In 1905 we started to build *Dreadnoughts*, and tried to keep them such a profound secret that everyone's suspicions were aroused. All the naval attachés set themselves to find out all about things, and no doubt succeeded. At any rate, we had no monopoly of *Dreadnoughts* now. There are many naval officers who did not approve of the *Dreadnought* type, and if the design of this vessel had been discussed we should have had the benefit of their views and reasons.

Passing to a point in regard to which he differed from Lord Brassey, the gallant Admiral referred to the author's apparent predilection for "ships of moderate dimensions." He had never been able to discover what moderate dimensions were. Sir William White had once sketched out designs as a *reductio ad absurdum*, for a vessel of 22,000 tons, which were laughed at. But already we had battleships of 20,000 tons, and it was said that the Americans were going to 22,000 tons. Lord Brassey had said that our naval experience and professional skill should now be directed to the

creation of a type of vessel for the inshore squadron. From this, again, Admiral Fitzgerald differed. He could not see what use ships with small guns and less speed and seagoing capacity could be round the coast. We had an enormous coast line, and an enemy would have no difficulty whatever in avoiding such ships, which could not either catch them or fight them with success. The only defensive policy for this country was to take the offensive vigorously, and it was totally wrong to put men and guns into small ships for coast defence, which were useless and unwanted.

Admiral Fremantle commented on the rise and fall of fashions in naval as in other matters. Some years ago Lord Randolph Churchill had resigned his seat in the Ministry because Mr. W. H. Smith insisted on the absolute necessity of fortifying coaling stations. Nobody now believed in the fortification of the stations in question. The speaker said he had never liked large protected cruisers, and had not yet discovered who did like them. When this class of vessel was produced the controller was Sir John Fisher, but no sooner did he become First Sea Lord than the vessels were relegated to obscurity, and the only one now in commission was the *Powerful*. Large armored cruisers had likewise gone out of fashion, the type having grown into battleships. The small *County* class were now being used up for various purposes; there were only ten of them. We had thirty-eight armored cruisers, but very few were available for their nominal function—namely, the protection of commerce. The speaker then referred at some length to an article which appeared in the *Morning Post* and read several extracts from it. He agreed with the writer of the article upon most points. Cruisers were specially valuable for detached service, such as scouting, obtaining and giving news, harrying commerce, holding positions, etc. Lord Nelson had relied largely on his cruisers for information. Wireless telegraphy and the speed and range of destroyers had minimized the importance of cruisers, but the speaker held that they were still necessary. The slow ones were not necessarily obsolete, as for many purposes an 18-knot ship was as good as a 25-knot ship. The Germans were building two 25-knot cruisers yearly. Lord Brassey, the speaker remarked, had always advocated mercantile auxiliaries, but strangely enough there was not a word about them in the paper. The Germans had a large number of mercantile vessels that would be useful in war, and, no doubt, in time the Admiralty would find this out. For our own navy we needed cruisers, and the speaker was glad to see that the *Liverpool* class was being constructed; we wanted, however, more than six a year. The necessity of battleships was undoubted. They "kept the ring" for the operations of other vessels, but if we were to be in a position to reap the fruits of naval supremacy, and not to lose our commerce in time of war, we must direct our attention to the cruiser question.

Professor J. H. Biles said the paper of Lord Brassey might be divided into two parts for purposes of discussion. The first part related to the question of secrecy. Nobody regretted more than the speaker that, for reasons of State or otherwise, the Admiralty had not been able to come forward in the way Lord Brassey would have liked and Admiral Fitzgerald considered they should have done. Unfortunately the meeting had not the reasons of the designs before them, and discussion was therefore restricted. He considered Admiral Fitzgerald was illogical in his remarks as to the procedure of the Admiralty at the time of the Royal Sovereigns. The discussion of the subject to which he had referred had made no difference to the results. [Admiral Fitzgerald: No, because we all agreed with them.] There was nothing to be said against too great freedom in giving information. Another navy had recently been developing with the greatest secrecy, and this, no doubt, retarded the acquisition of information by us.

The second point to which Professor Biles referred was the question of large *vs.* small warships. Lord Brassey was at present in a minority as regarded his views on this question. The point that seemed to be at the bottom of the author's desire for a large number of small ships rather than

fewer and larger ships was Sir Reginald Custance's statements as to the effect of concentrated fire at the battle of Tsushima. Everyone agreed that concentrated fire was important; but was it necessary to disperse the guns to obtain this effect? Lord Brassey seemed to consider that we needed small ships for narrow waters. It was quite rightly stated in the paper that the gun was useless against an invisible foe, while under similar conditions of night and fog the torpedo would be most formidable. But surely a torpedo-boat was equally handicapped by the invisibility of the enemy. The chief objection raised against the larger ships was that they cost so much, and the proverb concerning the danger of having too many eggs in one basket was often quoted. It was possible, however, for a few baskets to travel more safely than a large number.

Mr. Hillhouse desired to emphasize the point mentioned by Professor Biles regarding the concentration of fire. Sir Cyprian Bridge had said that mounting heavy armament in single ships reduced their numbers, which was quite true. Captain Mahan, again, had pointed out the sacrifices of combination, etc., involved by using fewer and bigger ships; but if one put the equipment of two small ships into one large one, the concentration of fire might be quite equally effective.

Professor Welch quite agreed with Mr. Hillhouse. If it were desired, he said, to bring eight 12-inch guns and a certain number of anti-torpedo guns into the presence of the enemy, the question to be considered was how might they best be brought there—whether in one ship or two. A dozen 12-inch guns and twenty anti-torpedo guns could be concentrated on one spot much more cheaply by one ship than by two. The two ships would cost about 1¼ millions sterling apiece, whereas the single ship carrying the whole armament could be produced for only 2 millions. The cost of running the single ship would also be less.

The chairman, Sir William White, said that Admiral Fremantle had expressed wonder that such ships as the *Powerful* and *Terrible* had ever been built, and went on to speak of the nebulosity of the Admiralty. The responsible naval architect had to get out designs to meet conditions laid down by the Admiralty. The ships in question were laid down for a special duty. There had been two or three large Russian cruisers built with the avowed object of harrying our commerce if necessary, and the *Powerful* and *Terrible* were designed to deal with these cruisers. Had the occasion arisen, they would certainly have done so. This was a matter of historical fact, only 15 or 16 years old, and the speaker considered no one had a right to describe such recent and well-known facts as mysterious. As regards the question of "moderate-sized ships," the speaker thought the definition as difficult as that of a moderate drinker. Speaking of the age-limit of ships, Sir William thought it sounded nice to say that a ship should be put out of service when 20 years old, but there was a distinction between this and assuming that the ship disappeared at that time for all practical purposes. In 1884 the speaker had built some ships for the Japanese government, and in 1905 these same ships destroyed Russian cruisers, which, of course, theoretically they were incapable of doing. The Japanese officers had a high regard for the old ships, Sir William White said he would not discuss big *vs.* little ships. In all military matters there were two things to be considered: First, power of concentration; and, secondly, power of distribution. As an example of this general principle, the tactics of Napoleon should be noted. This famous general always managed to fight with a force that was large as compared with that which the enemy could there and then oppose him with. In modern times, and with long-range guns, that concentration of fire which was so necessary could be obtained by a large number of ships working at great distances.

Lord Brassey replied very briefly, saying that he could not attempt to deal fully with all the arguments brought forward. The council had considered it advisable that the subject he had touched on in his paper should be brought forward for discussion, and he thought that the fact that the

Admiralty was subject to so little criticism showed that the country appreciated the efforts they made on behalf of our national security.—*Engineering.*

RECENT WARSHIP TRIALS.—With the completion of the trials of H. M. S. *Superb* the whole of the second series of battleships of the *Dreadnought* type will be finished and attached to an active fleet. The *Dreadnought* herself was commissioned two and a half years ago, and no little credit is due to the Admiralty and to private firms for the completion and commissioning in 1908-1909 of the three *Indomitable* class cruisers and the three *Superbs*, in which have been embodied the improvements due to experience with their prototype during her first commission. For speed and fighting power these ships stand alone; they are far superior in armament and system of protection to anything in commission in other navies, and they also possess qualities of habitability and comfort which, while not of such apparent importance on paper, are yet of extraordinary value for sea-keeping ships. It is no secret that these vessels are far larger in point of displacement than they are generally supposed to be. The legend displacement of the *Dreadnought* was 17,800 tons at 26 feet 6 inches mean draft; generally she proceeds to sea drawing nearly 30 feet and displacing about 20,800 tons. Much has been added to the *Bellerophon* class, and under the same conditions of coal supply and of stores, the new vessels will be over 21,000 tons. The same applies to the *Indomitable* class, but to a smaller extent.

The speed trials of all six ships, carried out at intervals during the past twelve months, have been particularly satisfactory. Records for speed and economy have been made with the armored cruisers, their propulsive efficiency being very high. With all six ships the steaming reliability has been extraordinarily good. The boiler equipment has been narrowed down to a choice of two types—Yarrow large tube or Babcock and Wilcox. The engines consist of Parsons turbines, and in all the ships of the same design are interchangeable as a whole. Much of the auxiliary machinery is to similar designs where not identical in the two classes. Most exhaustive trials have been run with all these vessels to determine the economy at all powers and under varying conditions. For instance, elaborate experimental trials have been made to settle the utility of cruising turbines, or the effect of the closed exhaust if introduced into the low-pressure turbines. In future cruising turbines will be discarded. From the point of view of speed only, while the actual figures are confidential, it can be stated that all the cruisers attained between 26 and 27 knots, and all the battleships 21.5 knots. The total coal consumption in relation to the power and speed was very low, the coal used per shaft horse-power frequently being less than 1.4 pound. In all cases a greater speed than that actually obtained was possible; the conditions in the stokeholds were remarkably easy, and in the case of the Yarrow boilers certainly, a good deal more might have been done had it not been thought advisable to keep the horse-power below about 45,000 in the *Indomitable* class and 27,000 in the *Bellerophons*. In the engine rooms the Parsons turbines have given the greatest satisfaction; no hitches of any kind have occurred, and even the stipulated opening out after the trial has been generally remitted, if not for all the cylinders, at least the two low-pressure turbines, with their important joints to the condensers, have been left undisturbed, so satisfactorily did they work. The general absence of vibration is as important in a warship as in a merchant vessel, on account of the sighting of the guns, and this improvement has been marked and highly appreciated.

The gun trials of the new vessels have also proved extremely instructive. The addition of side turrets with more powerful 12-inch guns caused a necessary alteration in the positions of the minor weapons on account of the effect of blast. How serious this can be was fully shown in the experiments on the *Dreadnought* and *Indomitable*, but the Admiralty construc-

tors had anticipated the evil and it was reduced to a minimum. It becomes a far more serious problem in a ship of the same length but with six turrets. Something must be sacrificed in weight to admit of an extra turret, weighing altogether nearly 600 tons, being got in on the same total displacement, and in the new German ships this is reported to have been done in the hull. How a hull which is relatively nearly 10 per cent lighter, will stand the extra concussion from six turrets is an interesting point. Fired on extreme bearings, the blast in the two ships mentioned caused sufficient damage to throw much light on the question of continuous firing from these all-big gun battleships, and the information gained since clearly indicates that some of these points have been overlooked in the German design. The steering trials have been attended with great success, and indicate that great improvements have been effected. Both classes of ships are very handy, and all possess very small turning circles and obey the smallest degree of helm. In seagoing qualities the cruisers are, perhaps, even better than the battleships. What is the most satisfactory feature of the new type of warship is undoubtedly the all-around excellence. The vessels represent in their two spheres a degree of perfection—perfection as it was known at the date of their being laid down—that has rarely been achieved in a new class of vessel. Compared with the *Royal Sovereigns*, the *Majestics* were a great improvement, and certainly were a basis design from 1895 till 1902, but there was no striking novelty in the improvement. The two greatest improvements in the new ships are in destructive power and in mobility; the former is more widely appreciated than the latter, but the latter is exceptionally good. The system of protection has also been immensely improved as the result of experience in the Japanese war.

Thoughout the whole series of ships the propelling machinery has proved very successful. In the case of the cruisers the trials at four-fifths of full power, representing over 23 knots and continuing for thirty hours on end, were followed almost immediately and without any mechanical adjustment by the eight-hour full-power trial. In other words, these ships covered in under 48 hours over 900 knots without a hitch and without touching their oil fuel, as on the contractors' speed trials coal alone was used. Such a run is equal to a trip from Rosyth to Hamburg and back! All steaming on trials was carried out practically under war conditions, for contractors are now rigidly limited to the number of men on watch at any time. The lack of any machinery defect, beyond occasional trivialities, on the steam trials, redounds to the credit of the contractors. That between fifteen and sixteen tons of coal an hour can propel a 19,000-ton battleship, 525 feet long over all, at 21.5 knots an hour is certainly an excellent result; the *Indomitable* required about 25½ tons an hour at over 26 knots, which is even better. The results from the three ships of each class corroborate one another in a marked manner; in fact, they are, within narrow limits, practically identical.

This type of ship has many critics, but they are not to be found among the men who have to work them. As far as we can learn, no public critic has indicated a reasonable, let alone a sound, line of improvement, but such possibilities are known in the necessary quarters, and the modifications will be made at an early date. The most frequent criticism is the lack of secondary armament—6-inch guns are demanded. As a matter of fact, the 6-inch gun has nearly fired its own death knell on ships of 500 feet in length, owing to the abnormal gas discharge per minute affecting the sighting. The design of these ships is peculiarly satisfactory, and they find many imitators abroad who have not arrived at such a design from independent fleet experiments, but by obviously copying British designs from data supplied by laborious espionage. The credit of the prototype design, now largely improved in detail, is due to the Admiralty and to their elaborate system of eliminating the unnecessary, and assimilating the good ideas put forward by all ranks of the naval service, and by constructors and engineers, both in the Admiralty service and private practice. The addition of six

such excellent capital ships to the Royal Navy in twelve months is a feat of which the Admiralty may well be proud. Most Englishmen, with national interests at heart, would like to see it repeated in the next and succeeding years.—*The Engineer.*

NEW TYPES OF WARSHIPS?—Everyone interested in the great naval question has been asking the meaning of the Prime Minister's recent cryptic utterance at Glasgow when he gave as a reason for the delay in the building of the four contingent *Dreadnoughts* the possibility of the evolution of a superior type. If, indeed, it were true that the Admiralty were now considering such a design, the reason might be accepted as justifying the delay of a few weeks or months, as the case might require, until the design was definitely settled; but if not, then the reason ceases to be a reason, and degenerates into a mere excuse. We cannot pretend to a knowledge of what is in the minds of the Board of Admiralty and their professional advisers, but a little consideration will show what the possibility is of a vessel being designed which will make the *Dreadnought* class obsolete, or at any rate which will be so far in advance of that class as to be accurately described as a new type.

There is a simple and homely illustration of the problem before the naval architect which is sometimes employed. In it the displacement of the vessel is likened to the sum of money which a thrifty housewife has to spend. It can be laid out in a number of different ways, some of which are essentials, some not essential but desirable, and the remainder luxuries. Displacement is what the naval architect has to spend, and, as in the case of the thrifty housewife, he cannot spend what he hasn't got, so that for a given total displacement he can only get a certain sum total of those qualities which are required in a battleship, those of armament, armor, protection, speed and coal endurance. Naval architects differ, like housewives, in the return they obtain for their outlay, and it is still to our credit that our own naval architects can obtain more offensive and defensive qualities per ton of displacement than our continental rivals. That this is so is due to Sir Philip Watts, Sir William White and their predecessors, who have been possessed of that species of genius which has been aptly described as an infinite capacity for taking pains. Their ships have often, on paper, been inferior to their foreign rivals, especially in the matter of armament; but close inspection of the designs has revealed this fact, that the displacement has not been so well spent in the foreign vessel. But the parallel can be pushed yet further. The tendency with ordinary commodities is towards cheapness, and the housewife finds that the purchasing power of the money she has to lay out is greater to-day than it was a decade ago. So with the naval architect. The continued improvement in guns, armor and machinery, enables more offensive and defensive qualities to be purchased for each ton of displacement than formerly; and it is by watching the development of each of these several constituents that one is able to form an opinion as to the probable development of the battleship as a whole.

If, therefore, we are to see a superior type of battleship, either we are on the point of, or have already reached, improvements in machinery, guns or armor, so that a better return is to be expected for a given outlay in displacement, or else—to continue the parallel—our naval architects are to be give more displacement to spend. The latter alternative, in other words, means still bigger ships. It is we suppose, regrettable but inevitable that the size should increase with time, but in view of the lack of dock accommodation—to mention one objection only—around our shores for vessels of the largest size, any immediate large increase of displacement is unthinkable. Practically the only dimension of our present *Dreadnought* class which can be safely altered is the length, the beam and draft are practically at their maximum for the width and depth of water over the sills of most of the docks available. But though increase of length is to a large extent necessary with increase of speed, it is not the most advantageous

way in which to spend additional displacement, as the weight of hull and armor are increased above their proper proportion, leaving less than a proportionate gain in armament. On has only to compare the principal features of the *Dreadnoughts* and *Invincibles* to see how true this is.

If, then, any large increase in size is improbable in the near future, we are driven to our first alternative—that, if a better and more powerful ship is to be designed, we must be on the eve of some great improvement in guns, armor or machinery. As regards the latter, it must be admitted that the introduction of the turbine for propulsion was one of the factors that made the *Dreadnought* design possible; but though continued improvements may be expected in the details of this class of engine as the result of experience at sea, there has been nothing in its development to lead one to suppose that any very great advance is to be expected in the power obtainable from a ton of machinery, while as to any other form of propulsion, such as the gas engine, its use is too remote a possibility for serious consideration as a present factor in the design of the largest ships. With regard to armor, too, the progress of metallurgical science has enabled greater resisting power to attack to be purchased at very much less cost in displacement now than formerly, but, as far as we are aware, there is no prospect of any very great advance being made in the immediate future, such as making an armor plate of, say, 9 inches in thickness, which shall be equal in resisting power to the 11-inch, which forms the main protection of the *Dreadnought* class. The uncertain factor in the present position is the gun. It has been rumored for some time past that the Admiralty have been experimenting with a new 13.5-inch weapon, and it has also been stated that the American Navy has been trying a gun of the same size, which has satisfactorily passed its tests and will be made the main armament of future battleships. It is however, to be noted that unless the number of guns to be mounted is to be reduced, any increase in caliber must be accompanied by an increase of displacement, not only on account of the extra weight of the guns and mountings themselves, but also because, logically, an increase in caliber should be accompanied by an increase in thickness of armor, and, further, unless the freeboard is to be reduced the increase of weight of guns should for reasons of stability involve some increase in beam. Apart from this consideration of the extra displacement involved—which may be anything from 2000 to 3000 tons—by the adoption of the 13.5-inch gun in vessels of the *Dreadnought* type, it should be quite certain that in view of the unsatisfactory history of the big-caliber gun in our own and the Italian Navy, the Admiralty will pause and very carefully consider the question before deciding to increase the bore, with all the consequences that such a step entails. It is to be noted that the Germans adhere to their 50-caliber 11-inch weapon. No advance in the direction of increased bore would be an improvement, unless the ratio of length to bore is maintained, and the present guns are already sufficiently long. A steel tube, 50 feet or so in length, is not an absolutely rigid structure, and to mention one point only, the difference between a dull day and bright sunlight causing a slight difference of temperature between the upper and lower surface of the barrel, and a slight droop of the muzzle, is sufficient to cause an appreciable difference in the shooting. This was a point specially noticed in the large-caliber guns, such as the 16.25-inch, fitted in two of the *Admiral* class. An increase of dimensions also means a reduction in the rate of firing, shorter life of the guns, larger magazines and shell rooms for the same number of rounds and other disabilities, and the demand for a larger caliber will have to be very imperative and amply justifiable before Mr. Asquith's superior type of vessel has a larger gun than the present 12-inch embodied in the design. Behind all these considerations is the further question as to whether the all-big-gun principle is really sound.

In the opinion of many competent and careful observers, the time has arrived when it is desirable to take stock of our position, and, as experience at sea accumulates, perfect the details of the types that we have rather

than launch out into fresh designs and further increases in dimensions. If this view be correct, then Mr. Asquith's reason for delay is, we repeat, no reason but a mere excuse, which will not bear investigation.—*The Engineer.*

DETERMINATION OF THE DISTANCE AND DIRECTION OF A SENDING STATION BY BARRETER MEASUREMENT.—In the collision of the *Florida* and the *Republic* the value of the wireless telegraph for marine service received signal proof. Nevertheless, although the *Baltic, Lucania, La Lorraine, Furnessia* and *Seneca* were equipped with wireless telegraph, without the praiseworthy devotion to duty of Operator Binns, aid for the passengers of the *Republic* would doubtless have arrived too late, and in another similar case a like devotion might not have such a happy consequence. It, therefore, would be most desirable if, by means of automatic signals, a sinking ship could give notice of its distance and direction to other vessels. In case of the telegraph operator having sustained injury a sailor could then signal, say, the letter *t* at regular intervals, and this would quite suffice to determine the distance and direction of the imperiled ship. The writer here refers only to the case of a rescuing ship with an ordinary antenna, and excludes the case of a ship equipped with so-called directive antennæ.

According to Duddell's rule, the distance between a transmitter and receiver, multiplied by the strength of the incoming current, is a constant. This rule was proved by Duddell for considerable distances, but also applies to shorter distances. If, for instance, this constant were 10,000 km.-microamperes, then at 50 km. the current would be 200 microamperes; at 47 km., 212.7 microamperes, and at 43 km., 188.6 microamperes. These values can be measured conveniently with the pointer galvanometer of a Gati barretter-measuring set.

For example, the rescuing ship—say, the *Baltic*—finds the incoming current to be 200 microamperes, and if after the run of 3 km. on its original course the current is again found to be 200 microamperes, the *Baltic* knows that she is not nearing the *Republic*. Now, if the vessel changes to a course perpendicular to the former one, and after 3 km. gets 212.7 microamperes, it will be known that she is on the right course, and that the distance is 47 km. One can always determine the distance of the imperiled ship by two measurements made on different courses with the aid of some calculations. It is not even necessary to know the constant. If the sinking ship does not emit waves constantly, the measures must be repeatedly made.

It is extremely desirable for wireless stations to apply the Duddell rule, particularly since the constant gives an indication of the efficiency of the station transmissions. Although damping measurements, as stated by Hahnsmann, have only received recognition since 1906, and the proposed constant measurement has not as yet been put into practical use, it nevertheless seems to the writer that measurements of the kind suggested should be compulsorily exacted in the interest of humanity.—*Bela Gati*, in the *Electrical World*.

It is theoretically possible, as the preceding article points out, to make two runs on courses of defined length and direction, and from the three received current strengths at the beginning and end of the runs, as well as the intermediate turning point, to compute the distance of the sending station from the location at the end of the runs. But it is not even necessary to make a computation. The same result can be attained graphically. The first run AB may be laid off on the chart in length and direction and, with center A, a circle may be drawn with a radius equal to n/i_1, where n is any convenient number and i_1 the received current at A. Similarly with center B, another circle can be drawn with radius n/i_2. The two circles will mutually intersect at two points. By repeating the operation with new arbitrarily assigned values for n, similar pairs of intersection points may be obtained in a few minutes without any calculation. The locus of all such

points will be an ellipse having its major axis upon the line of the course prolonged at one or the other end. The ellipse also intersects the course perpendicularly. The sending station will theoretically lie somewhere on this ellipse, if no drifting has occurred during the run. If now the course be changed at B along a line BC on the chart, a similar set of intersecting pairs of circles can be drawn from the centers B and C as before, and the elliptical locus of these intersections can be arrived at graphically after a few trials. The sending station will then lie theoretically at one of the two intersections of these locus ellipses, and it will be easy to see which junction is the position sought because, in general, one position only is a possible one in view of the three received current strengths i_a, i_b and i_c. For the greatest precision, the two courses AB and BC should in general have the same length and be mutually perpendicular. It is much easier to lay out such a plan of operations comfortably on paper with the courses laid down on the chart in advance and the sending station sending signals at convenience and on schedule time than in foggy weather, on a rolling ship, with the sending station in imminent peril of sinking, and all officers under a great tension. Nevertheless, the plan seems capable of service to some extent at least.—*Electrical World.*

THE DECLINE OF THE LUNAR DISTANCE FOR THE DETERMINATION OF THE TIME AND LONGITUDE AT SEA. By G. W. Littlehales.—In the March number of volume 44 of *Gaea* (1908), there appears an article, under the title "Der gegenwärtige Streit über die beste Methode zur Bestimmung der geographischen Länge auf dem Meere," which is of interest at the present time when the governments of the United States, Great Britain and France have decided upon the elimination of the lunar-distance tables from the Nautical Almanacs published for the use of navigators. This account impresses upon us the long course of years during which it was deemed necessary to furnish these tables, with the object of facilitating the determination of the time at sea, notwithstanding the uninterrupted growth of the employment by seamen of the marine chronometer for the same purpose.

Some years ago, the late Captain Lecky, one of the most widely known of the English authors upon the subject of navigation, declared, in his characteristic, jocular style, that "Lunars are as dead as Julius Cæsar"; and the last annual report of the superintendent of the United States Naval Observatory at Washington contains the following passage:

"The tables of lunar distances will be omitted hereafter. Inquiries made in October, 1907, by the Chief of Bureau of Equipment, developed the fact that these tables are practically no longer used by the navigators of either the naval service or of the merchant marine, and authority has been given for their omission, beginning with the volume for 1912."

The lunar-distance tables were omitted from the *Connaissance des Temps* for the year 1905, after having retained their place in the French official ephemeris for 131 years; and from the British Nautical Almanac for 1907, after having been presented annually since the year 1767, when Maskelyne's tables were published.

Not long before the publication of the lunar-distance tables, the first marine chronometer was produced by John Harrison, and, as some years elapsed before this instrument was well known among navigators, the tables probably gained currency among seamen before the chronometer came into general use. Cook observed and calculated over 600 lunar distances to obtain the longitude of Strip Cove, New Zealand; and, in 1777, he observed 1000 lunar distances to determine the longitude of Tonga-tabu; and all this with inferior instruments for the purpose. Dr. Bolte, observing with the improved instruments of the present day, obtained longitudes with a probable error of 22″ from 34 observations of lunar distances of the sun, and with a probable error of 31″ from observations of the lunar distances of stars.

At sea the observation of a lunar distance requires great accuracy and skill, especially if there be much vibration in the vessel; and it is found that

hardly one navigator in two hundred has ever carried out the calculation of a longitude by the lunar-distance method in practice. Although this method can scarcely be said now to survive, it was a good service to have at the disposal of navigators for more than two hundred years the means for carrying it out, and it was a vast improvement upon antecedent methods for the astronomical determination of longitudes, chiefly because scarcely any of these earlier methods could be made available for use at sea.

The early astronomers made use of eclipses of the moon in determining differences of time, as in the instance when the longitude of Toledo from Bagdad was determined by the Arabian astronomer Arzachel; and, in the days of the great discoverers, navigators sometimes attempted to use this method for the purpose of finding the longitudes of distant stations with reference to places in Europe. By means of eclipses of the moon, Columbus found the longitude of a point in the New World to be 108¾° west of Cadiz, but this determination was 40° in error and it was not until long after the generation in which Columbus lived that the facilities for using the method became sufficient to reduce the errors of the longitudes determined in this manner to within 2 minutes of arc. No matter how precise and easy this method might have become, it could never be hoped that it would meet the daily demands for determinations of longitude, because eclipses are not frequent enough for this purpose.

It will be remembered that, during the generations when the minds of investigators were bent on formulating a practical method of determining longitude at sea, Gerhard Mercator proposed the use of the variation of the compass as a means of identifying geographical position, and it may be that this method would have attained a measure of success if it had not been for the successful advent of the chronometer. This is the same Gerhard Mercator who issued the first map or chart by the method of projection which to this day substantially helps in carrying on all the deap-sea commerce of the world.

After Galileo's observations of the moons of Jupiter, Domenico Cassini computed tables of their occultations; and by the aid of these tables Kepler calculated the difference of longitude between Löwen and Vienna within 6′, and Picard and Lahire deduced the longitudes of the most important places in France. As these tables are still somewhat uncertain, but little use is known to have been made of them in our own times beyond their employment by Nansen for finding the longitudes of islands in the Arctic regions.

Another method which was sometimes used by the early voyagers, but which could scarcely be hoped to be adequate to the requirements of navigation, on account of the infrequency of the phenomenon to be observed, was the method of conjunctions. For example, in 1499, on the coast of Venezuela, Amerigo Vespucci observed the moon to be 1° east of Mars at 7.30 o'clock in the evening and 5½° east at midnight. From which it was calculated that these two bodies must have been in conjunction at 6.30 o'clock. But, according to the tables of Regiomontanus (Johann Müller), the same conjunction took place at Nuremberg at midnight, and so the longitude of the point of observation on the coast of Venezuela must have been 5½ hours, or 82½° west of Nuremberg.

It is interesting to look back over the couse of progress in determining longitude at sea and review its effect as a contributive agency in advancing geography and benefiting commerce. We may muse upon the stage of the total inability of Columbus to find the time at sea by astronomical observations and see it givng place to the stage of rude approximation which prevailed in the fleets of Lord Nelson; and then meditate upon the advanced conditions of the present day, in which the local time at any meridian can be readily found almost without computation and be compared, for the purpose of finding longitude, with the time as given by chronometers regulated to the prime meridian and kept under perfect control by time-signals, which the observatories send broadcast over the oceans at fixed instants through the agency of wireless telegraphy.—*Bulletin of the American Geographical Society.*

BOOK NOTICES.

"Statistical and Chronological History of the United States Navy," 1775-1907. By Robert Wilden Neeser, Fellow of Yale College. Vol. 1, 153 leaves; Vol. 2, 487 pages. Folio. New York: The Macmillan Company, 1909. Price, $12.00 net.

The purpose aimed at in these mammoth and well-executed volumes is best shown by the following extracts from the preface of the work:

"The need of a work which would give the student accurate and complete information, together with an analysis of the sources consulted, early impressed me, and it was mainly with a view of furnishing such data that this compilation was undertaken. At first the investigations were limited to my own library, but, as the field expanded, it became apparent that the entire subject must be more fully treated, and search extended beyond books to the original manuscript records, at home and abroad.

"The simplest manner of covering the subject was adopted. The work was divided into five parts, each to be complete in itself, and the whole to constitute a comprehensive reference of our naval history."

The titles of the parts are as follows:

"Part 1.—Administration of the Navy Department, and events and dates of reference in United States Naval History.

"Part 2.—Engagements, expeditions and captures of vessels of war.

"Part 3.—Captures of merchantmen.

"Part 4.—A complete record of every vessel's service and fate.

"Part 5.—American Privateers, 1772-1862; The State Navies, 1775-1783; The Confederate States' Navy, 1861-1865."

"Under each event, in addition to the tabular data, I have endeavored to give a complete list of references to the exact volume and page of every work dealing with the subject, and have enumerated, in footnotes, such statements, with their authorities, which, in my opinion, were at variance with the facts. In determining these facts, reliance has in all cases been laid upon original manuscripts in the Archives of the United States Government in Washington, the British Admiralty Records in London, and the Archives de la Marine in Paris. Where sufficient material could not be found in these sources, published accounts have been consulted. Every effort has been made to present here a complete bibliography of all publications relating to the United States Navy, both official and unofficial, which have appeared previous to January 1, 1907. The catalogues and shelves of the Library of Congress, the New York and Boston Public Libraries, the Library of the Superintendent of Documents, the Library of the Navy Department, the British Museum and the Bibliothèque Nationale, besides numerous private collections and libraries, have been carefully gone over.

"As the first three parts, here offered, are complete in themselves, and contain data concerning every engagement, capture, expedition or other achievement of the navy prior to the 1st of January, 1907, the remainder of the work may be considered, in a measure, supplementary. At present, however, no definite statement can be made as to when the other two

parts will be finished; the researches necessary for their completion will cover a number of years, and it would not, therefore, be wise to make any promises."

It only remains to be said that the promise of the preface appears to have been faithfully carried out, and the dominant feeling, on opening the book, is one of amazement at the amount of prolonged and painstaking work that it represents. This is no work of the imagination, but one of downright toil, and carefully considered plan and arrangement. The entire first volume, which is printed on only one side of the leaf, is occupied with the bibliography of the manuscript and printed sources of information, and is closed with a minute author and subject index.

The second volume contains Parts 1, 2 and 3, of the above mentioned five parts. The initial date of each part is as follows:

Part 1, October 13 ,1775; Part 2, February 17, 1776; Part 3, May 9, 1776. The record in each case is brought up to January 1, 1907.

The material is uniformly arranged in chronological-tabular form, exhibiting in full detail the particulars of each event, and giving copious references to the sources of information that are listed in the first volume.[1]

From this description it may be seen that these volumes furnish the seeker after knowledge with a complete index-analysis of the history of the United States Navy. No such index to the naval literature of any other country exists, and these volumes set a high standard of excellence to be attained by other workers in a kindred field.

Fortunate may any nation be reckoned that can produce a student whose enthusiastic patriotism leads him to pursue to a successful conclusion such a monumental synopsis of the record of his country's activities on the sea.

"Chaudières Marines et Accessoires, avec notes de résistance des matériaux et de thermodynamique." Published by T. Alté, Toulon, France. 8°. 520 pages, with atlas of 37 plates. 22 francs.

This work on naval boilers, by L. Jauch and A. Masméjeau, French naval engineers and professors at the Toulon School of Engineers, is the first part of a complete course in marine engineering. There has long been felt a need for a work which should be neither a purely theoretical treatise nor a mere manual of practical rules, but a reliable and comprehensive guide in all questions regarding the use and maintenance of marine machinery. This book, which has just been published, fulfills this object in so far as steam generators are concerned. Beginning with notes on the strength of materials and on thermodynamics, the authors continue with chapters describing in detail the manufacture of boilers, their use, wear and maintenance, the various types used on ships, their relative advantages for use on warships, their accessories, etc. A chapter is also devoted to oil fuel. Besides its general exposition of the subject of naval boilers, this work contains an amount of practical information of all sorts, details of constructions, experimental data and results of tests such as to make it of great value to all who are interested in the study of steam engineering.

[1] An exhaustive index of the names of ships and of commanders renders all of this material available for quick reference.

LIST OF PRIZE ESSAYS.

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Naval Education. Prize Essay, 1879. By Lieut.-Com. A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut.-Com. C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880.

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881.

The Type of (I) Armored Vessel, (II) Cruiser best suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882.

Our Merchant Marine: The Causes of its Decline and the Means to be taken for its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. J. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut.-Com. F. F. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883.

How may the Sphere of Usefulness of Naval Officers be extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CUILIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884.

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885.

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886.

What Changes in Organization and Drill are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887.

The Naval Brigade: its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888.

Torpedoes. Prize Essay, 1888. By Lieut.-Com. W. W. Reisinger, U. S. N.

1891.

The Enlistment, Training and Organization of Crews for our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892.

Torpedo-boats: their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894.

The U.S.S. Vesuvius, with Special Reference to her Pneumatic Battery. Prize Essay, 1894. By Lieut.-Com. Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895.

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut.-Com. Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896.

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897.

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898.

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut.-Com. Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900.

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901.

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903.

Gunnery in Our Navy. The Causes of its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904.

The Fleet and its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL, AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905.

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear-Admiral Stephen B. Luce, U. S. N.

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Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut.-Com. A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907.

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A few thoughts on our next step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut.-Comdr. Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908.

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

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A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

NOTICE.

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It now enters upon its thirty-sixth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII.

Sec. 1. The Institute shall consist of regular, life, honorary, and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fee to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life-members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control, and, if their report be favorable, the Secretary and Treasurer shall make known the result at the next meeting of the Institute, and a vote shall then be taken, a majority of votes cast by members present electing."

The Proceedings are published quarterly, and may be obtained by non-members upon application to the Secretary and Treasurer at Annapolis, Md. Inventors of articles connected with the naval profession will be afforded an opportunity of exhibiting and explaining their inventions. A description of such inventions as may be deemed by the Board of Control of use to the service will be published in the Proceedings.

Single copies of the Proceedings, $1.00. Back numbers and complete sets can be obtained by applying to the Secretary and Treasurer, Annapolis, Md.

Annual subscriptions for non-members, $3.50. Annual dues for members and associate members, $3.00. Life members fee, $30.00.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE.

NAVAL INSTITUTE PRIZE ESSAY, 1910.

A prize of two hundred dollars, with a gold medal, and a life-membership in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession, subject to the following rules:

1. The award for the prize shall be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1910. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the Proceedings of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the Proceedings of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writer of the first of them in order of merit will receive seventy-five dollars and a life-membership in the Institute.

6. Any essay not having received honorable mention, may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages of the Proceedings of the Institute.

8. All essays submitted must be either typewritten or copied in a clear and legible hand.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

PHILIP R. ALGER,
Professor, U. S. N., Secretary and Treasurer.

United States Naval Institute Proceedings

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